

Figure 1

100

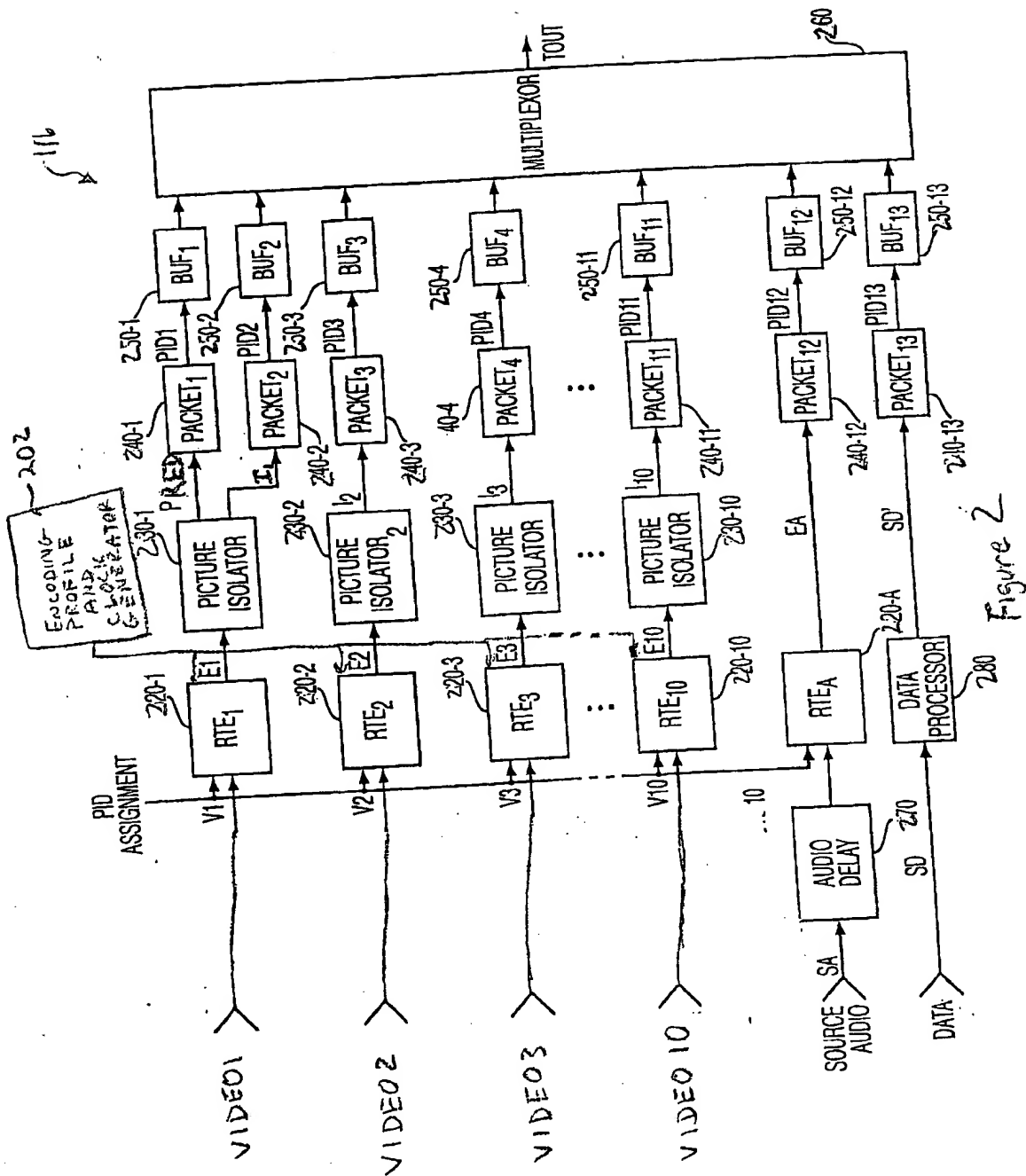


Figure 2

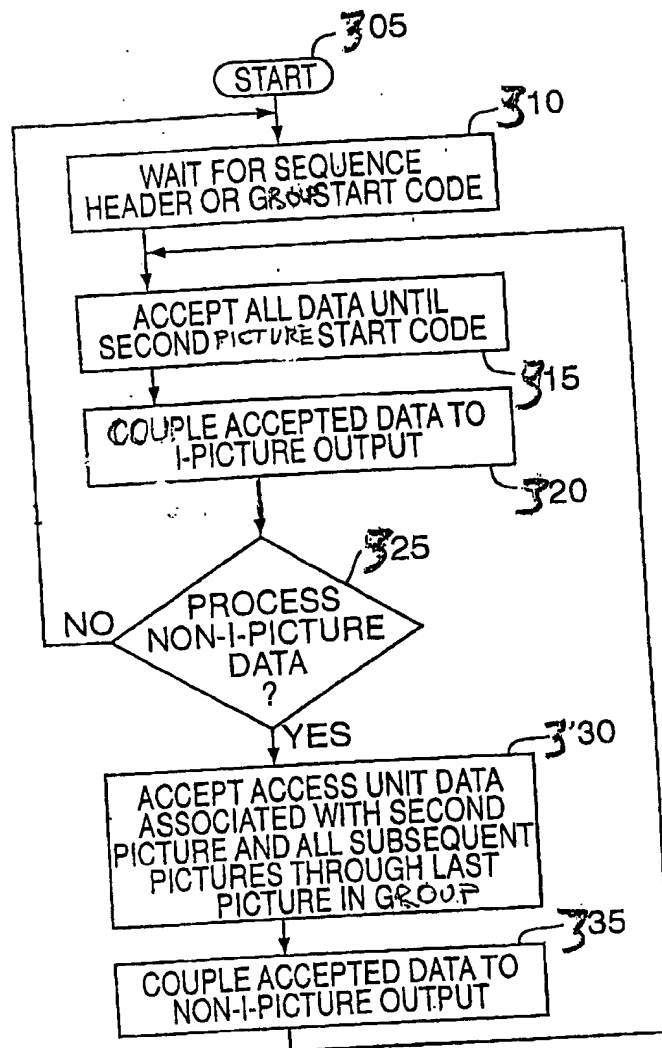
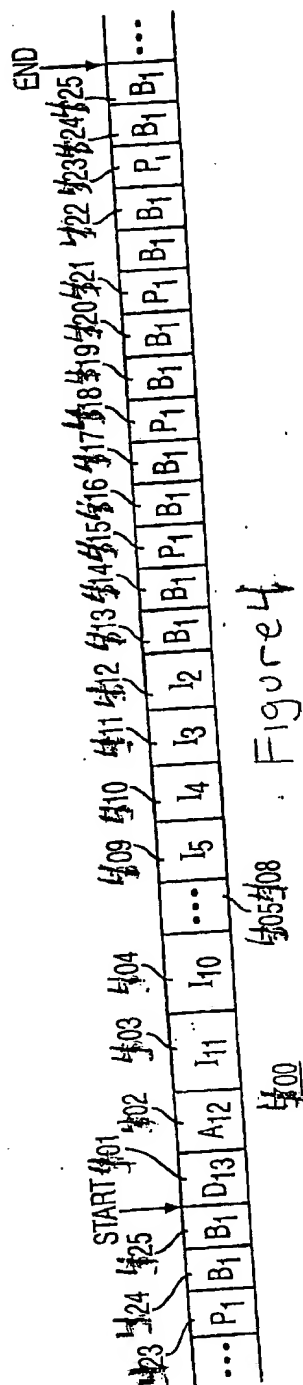


Figure 3



The diagram illustrates a video receiver system 124. At the top, a group of antennas (BS1, BS2, ..., BSN) is shown within an oval, each with a signal path labeled 'M'. A signal from the 'FROM FORWARD CHANNEL' enters a 'TUNER' block 510. The tuner outputs an 'IF' signal to a 'DEMODULATOR' block 520, which also receives a 'TUNE' signal from the tuner. The demodulator outputs a 'TD' signal to a 'TRANSPORT DEMUX' block 530. The transport demux has three main outputs: 'A' to an 'AUDIO DECODER' block 540, 'V' to a 'VIDEO DECODER' block 550, and 'DATA' to an 'OSD' block 560. The audio decoder outputs 'AD' to 'TO AUDIO PROCESSOR'. The video decoder outputs 'VD' to a 'COMPOSITOR' block 590. The OSD block 560 outputs 'VOSD' to the compositor. The compositor outputs 'F' to a 'FRAME STORE' block 562, which then outputs 'TO VIDEO PROCESSOR'. A 'MODULATOR' block 595 receives a signal from the demodulator and outputs 'TO BACK CHANNEL'. A central 'CONTROLLER' block 570 is connected to the tuner, demodulator, transport demux, and frame store. It contains an 'I/R' (Infrared) receiver 575, a processor 'P' 572, 'SUPPORT CIRCUITS' 578, and 'MEMORY' 576. The memory contains a 'USER INTERACTION ROUTINE' 500, 'OVERLAY STORAGE' 576, and a 'STREAM PROCESSING ROUTINE' 502. A joystick 580 with an 8-position joystick, number pad, select key, freeze key, and return key is connected to the I/R receiver. The entire system is labeled 124.

Figure 5

```

graph TD
    605([START]) --> 610[WAIT FOR DESIRED I-STREAM PID]
    610 --> 615[EXTRACT PACKETS OF DESIRED I-STREAM PID]
    615 --> 620[COUPLE PAYLOAD'S OF DESIRED I-STREAM PACKETS TO VIDEO DECODER]
    620 --> 625[EXTRACT PACKETS OF PREDICTED PICTURE STREAM PID]
    625 --> 630[COUPLE PAYLOAD'S OF PREDICTED PICTURE STREAM PACKETS TO VIDEO DECODER]
    630 --> 635{SELECT A DIFFERENT I-PICTURE STREAM?}
    635 -- NO --> 600([END])
    635 -- YES --> 640[IDENTIFY PID OF NEW DESIRED I-PICTURE]
    640 --> 610
  
```

! 600

660727 23059400

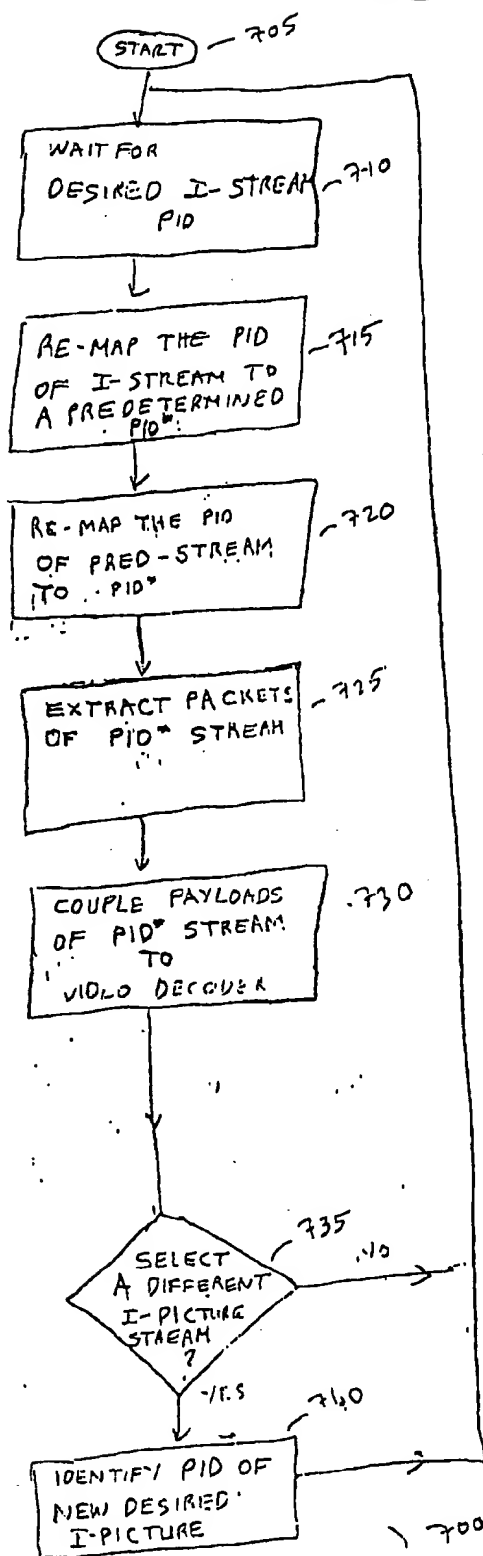


Figure 7

```

graph TD
    START([START]) --> 810[WAIT FOR DESIRED I-STREAM]
    810 --> 815[EXTRACT PACKETS OF DESIRED I-STREAM UNTIL SPICE COUNTDOWN PACKET (INCLUDING)]
    815 --> 820[COUPLE PAYLOADS OF DESIRED I-STREAM PACKETS TO VIDEO DECODER]
    820 --> 825[RE-PROGRAM PID FILTER TO RECEIVE PRED-STREAM]
    825 --> 830[EXTRACT PACKETS OF PRED-STREAM UNTIL "0" SPICE COUNTDOWN PACKET (INCLUDING)]
    830 --> 835[COUPLE PAYLOADS OF PRED-STREAM PACKETS TO VIDEO DECODER]
    835 --> 840{SELECT A DIFFERENT I-PICTURE STREAM?}
    840 -- NO --> 850[RE-PROGRAM PID FILTER TO RECEIVE I-STREAM PID]
    840 -- YES --> 845[IDENTIFY PID OF NEW DESIRED I-PICTURE]
    850 --> 810
    845 --> 850

```

1. 800

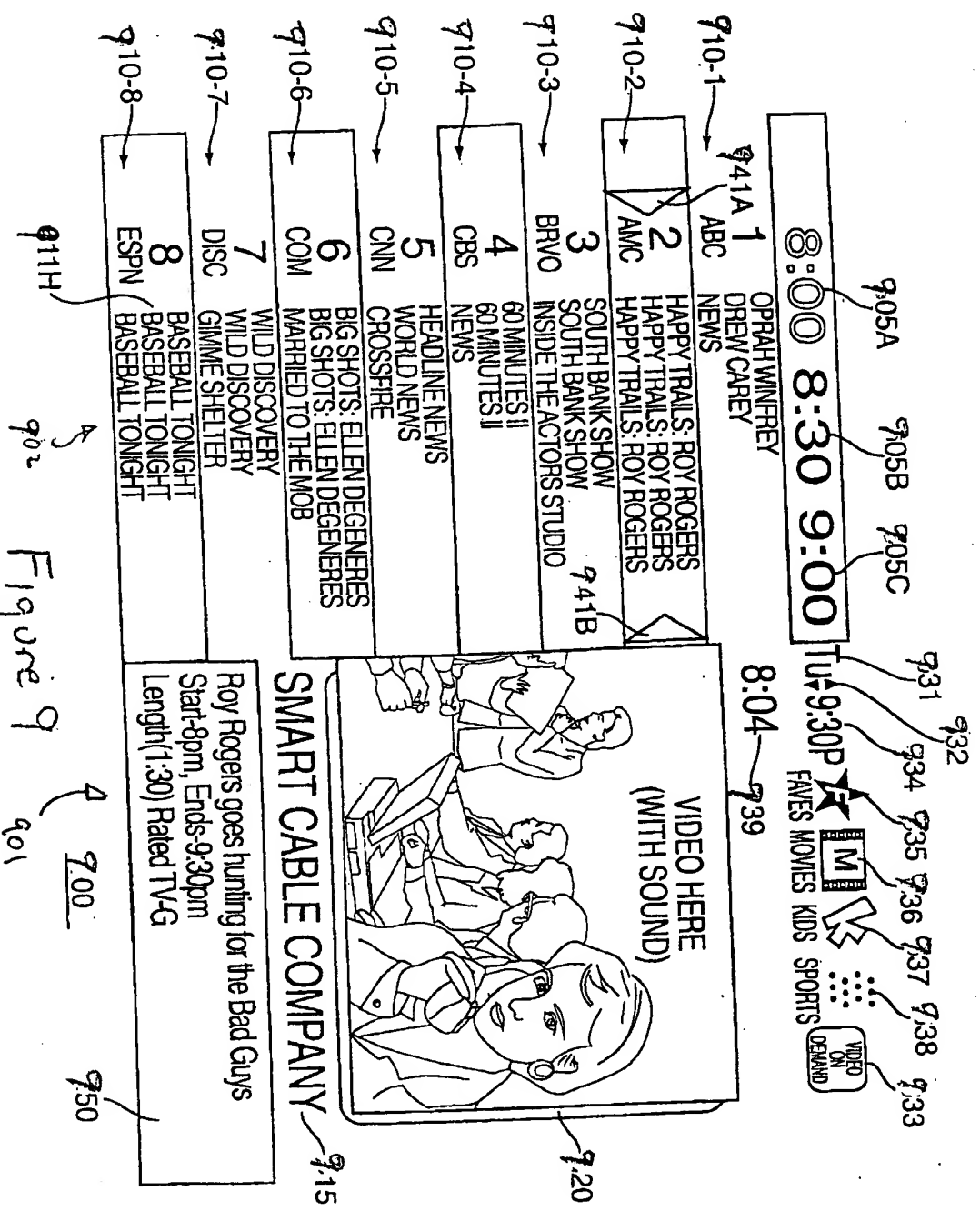


Figure 9

SLICE 1 (g/s1)	SLICE 1 (v/s1)
SLICE 2 (g/s2)	SLICE 2 (v/s2)
⋮	⋮
SLICE N (g/sN)	SLICE N (v/sN)

900 →

↑
902

↑901

FIGURE

9A

0045987 121099

9:30 10:00 10:30 Tu-W-F-Sa

FAMES FAMES KIDS SPORTS

8:04

1
ABC
DHARMA & GREG
IT'S LIKE YOU KNOW
NEWS

2	PATTON PATTON PATTON AMC PATTON
---	---

3
BRAVO ROSALUXEMBERG
ROSALUXEMBERG
ROSALUXEMBERG

4
CBS
PAYNE ROYAL
NANNY
60 MINUTES II

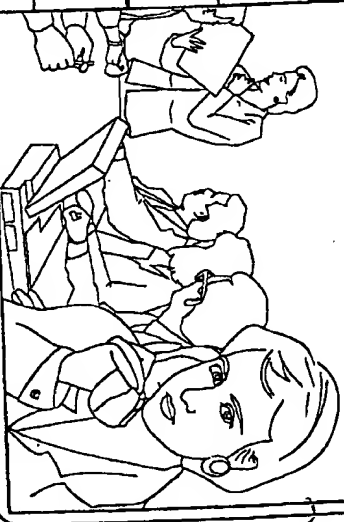
SPORTS TONIGHT
MONEYLINE
LARRY KING LIVE
5
CNN

6 SINBAD: BRAIN DAMAGE
SINBAD: BRAIN DAMAGE
COM COMICS COME HOME

SCIENCE OF MAGIC
SCIENCE OF MAGIC
DISCOVER MAGAZINE

DISC	DISCOVERY TV CENTER
8	SPORTS CENTER
ESPN	SPORTS CENTER
	BASEBALL TONIGHT

VIDEO HERE



SMART CABLE COMPANY

PATTON, GEORGE C SCOTT, KARL MALDEN

Start-9:30p, Ends-11:00p

Length(1:30) Rated TV-PG

1000

1002

Figure 10

h

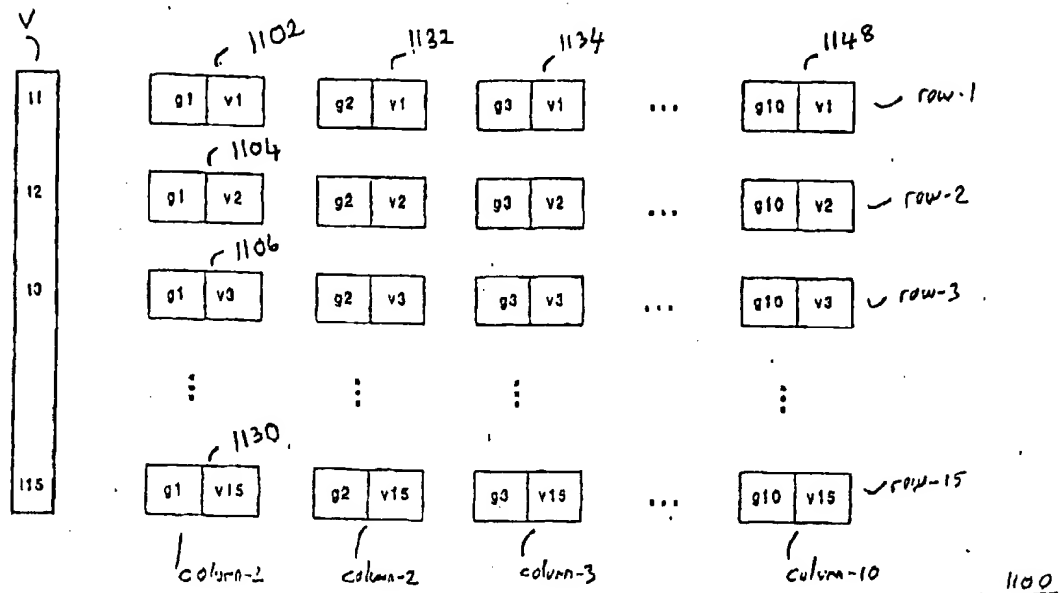


Figure 11

Figure 6. The effect of the number of iterations (n) on the accuracy of the proposed algorithm. The results are shown for different values of α and β . The x-axis represents the number of iterations (n), ranging from 0 to 100. The y-axis represents the accuracy, ranging from 0.8 to 1.0. The legend indicates four cases: $(\alpha = 0.9, \beta = 0.9)$, $(\alpha = 0.9, \beta = 0.7)$, $(\alpha = 0.7, \beta = 0.9)$, and $(\alpha = 0.7, \beta = 0.7)$.

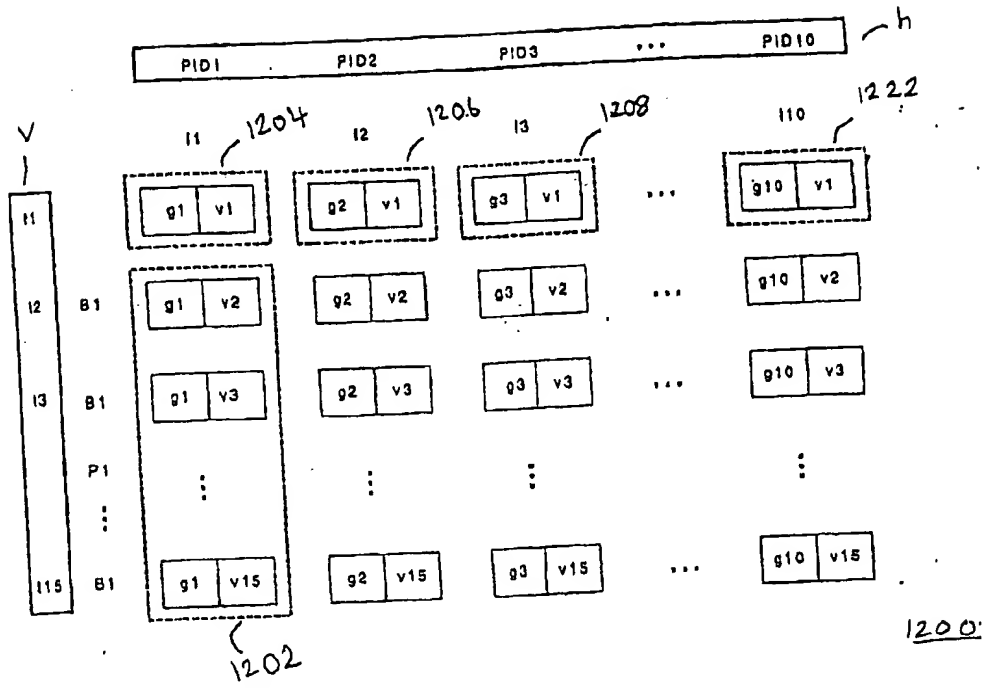


Figure 12

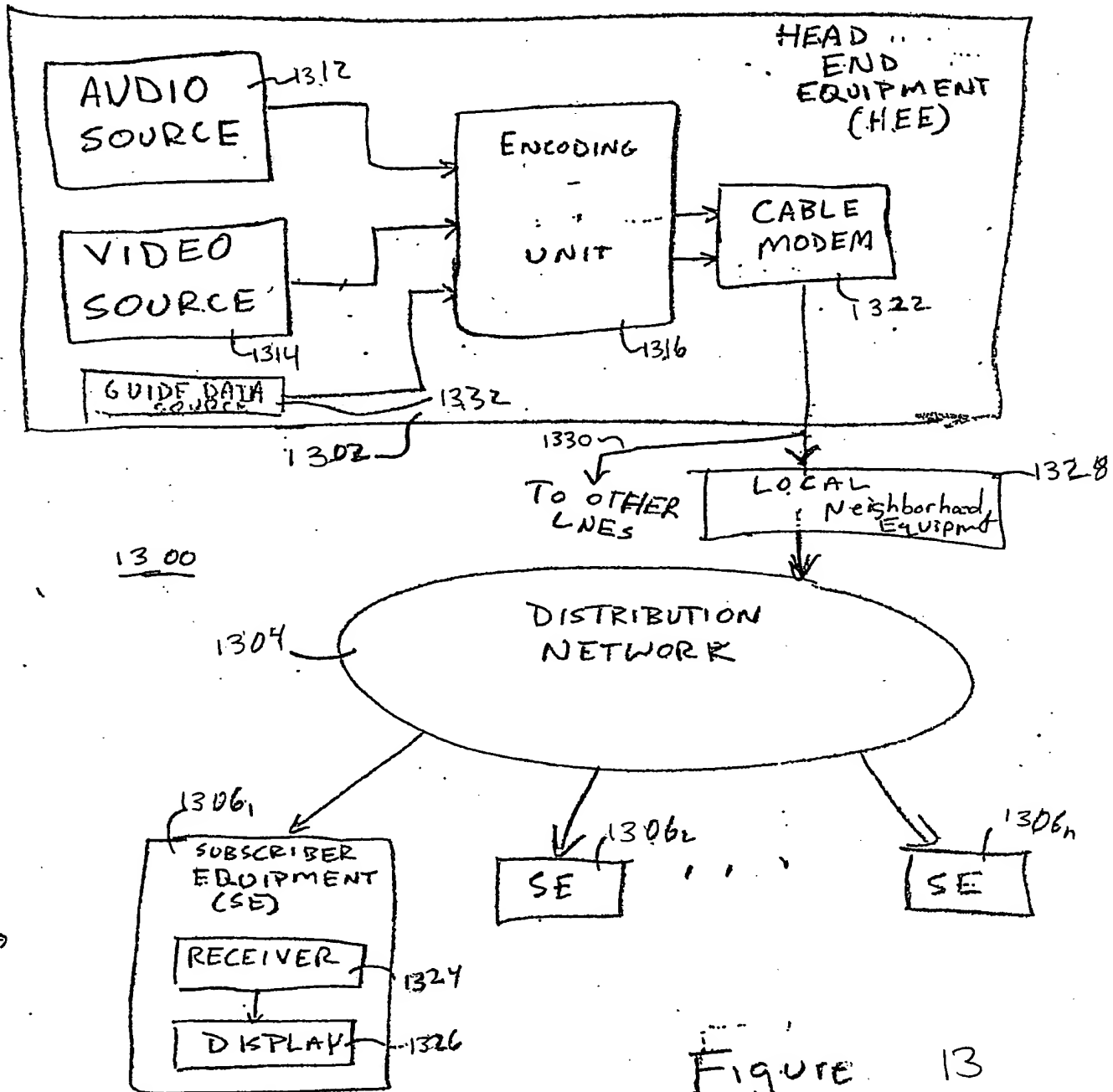


Figure 13

1316

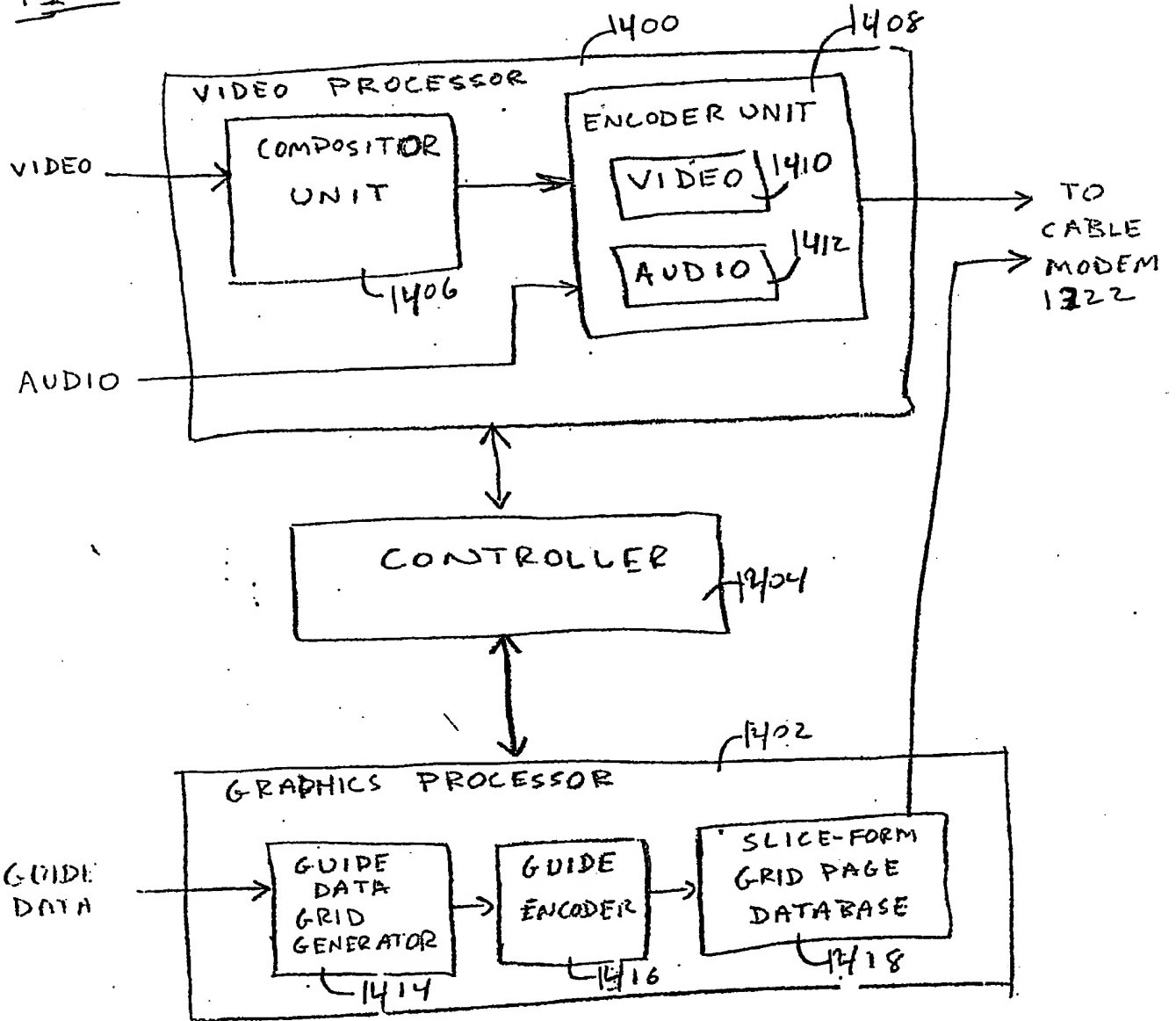


FIGURE 14

1328

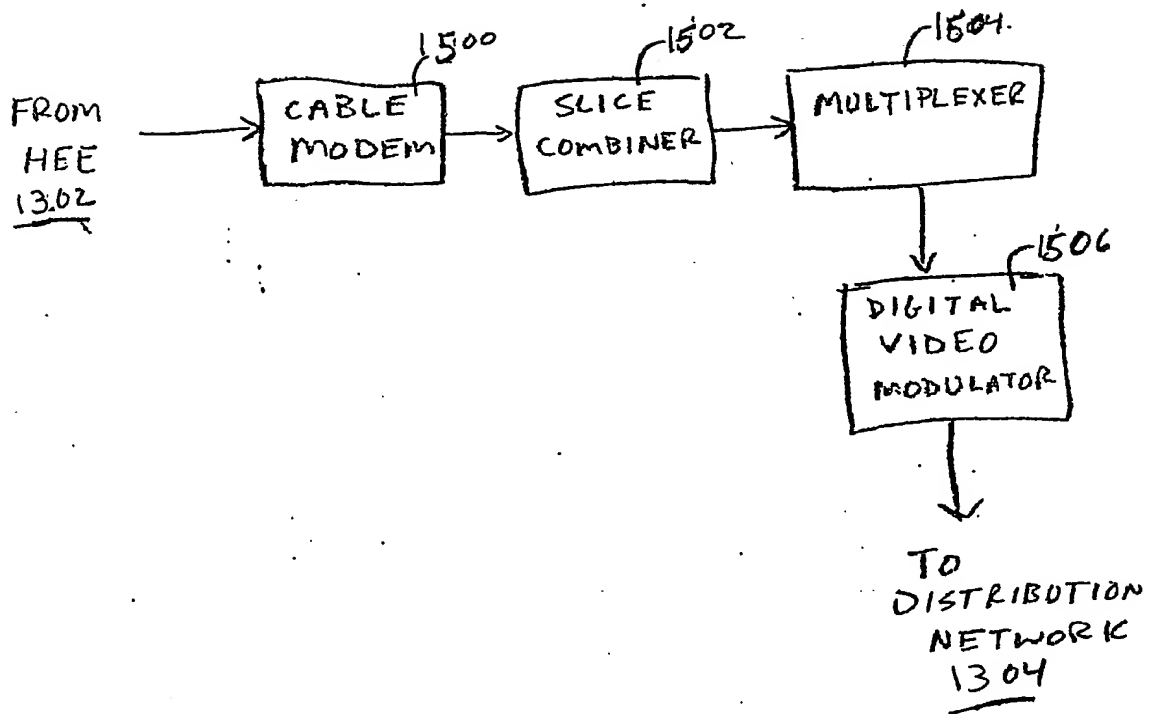


FIGURE 15

660227 265940

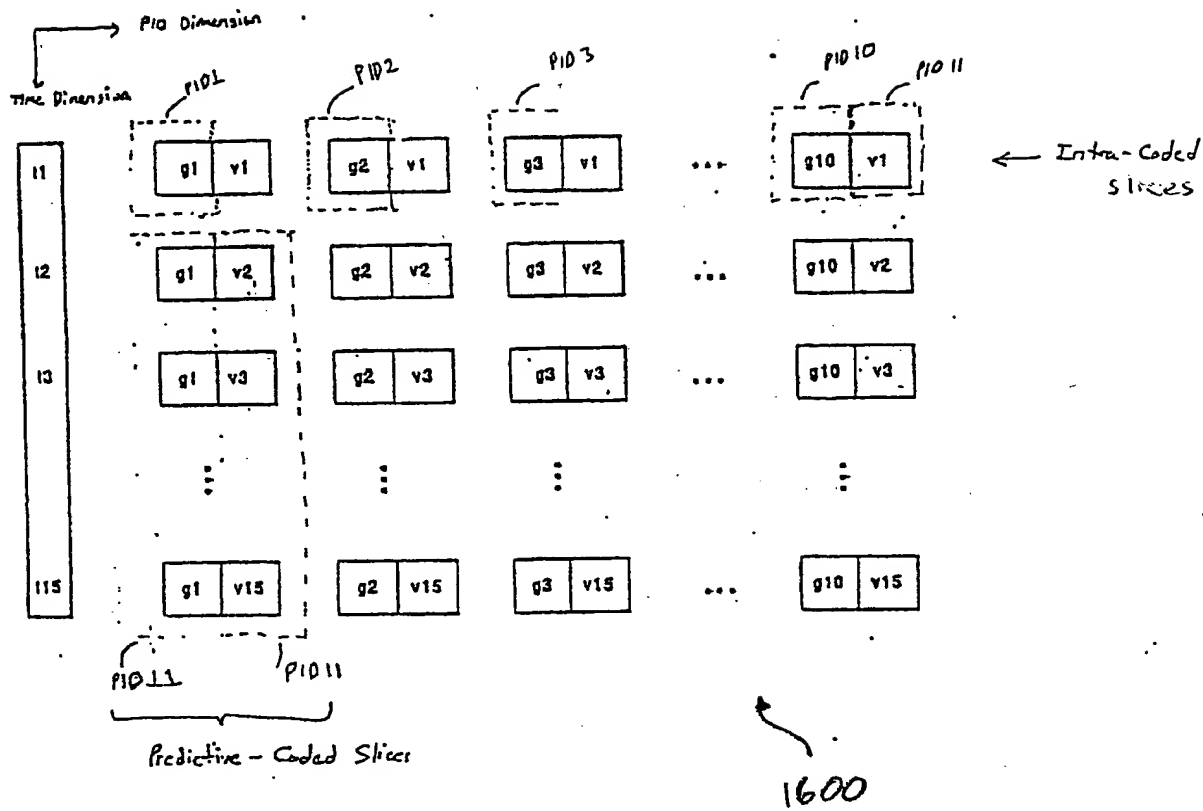


Figure 16

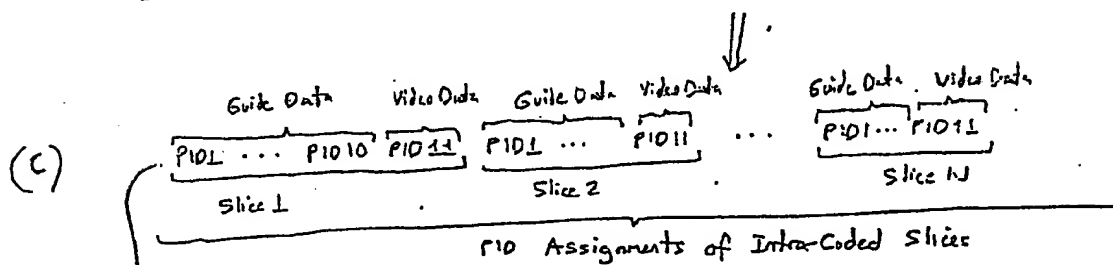
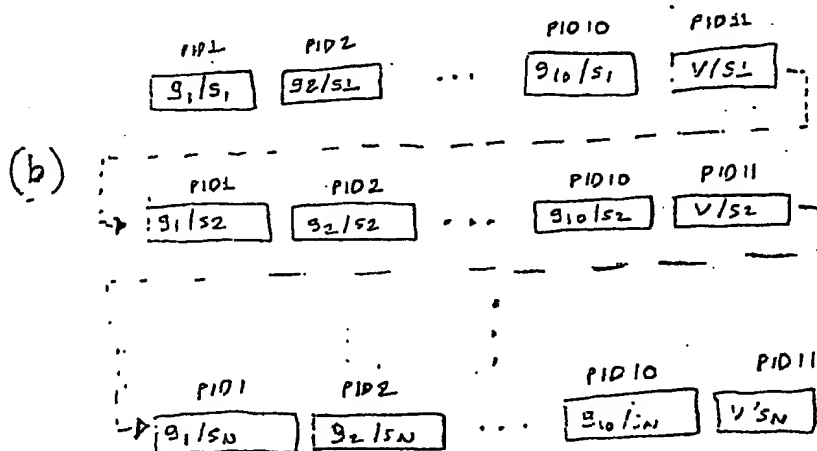
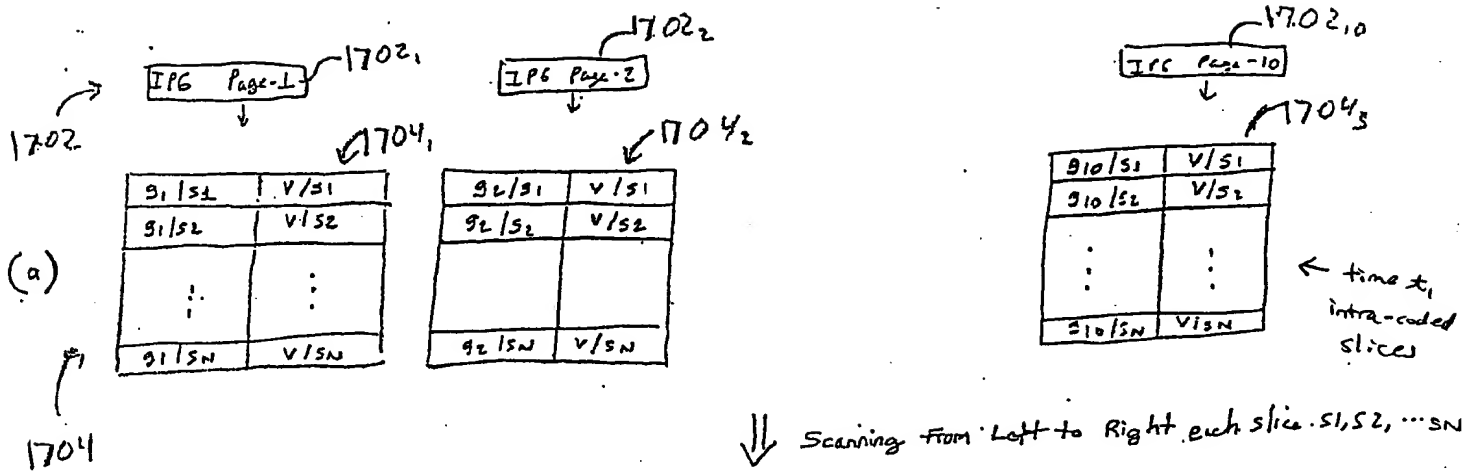
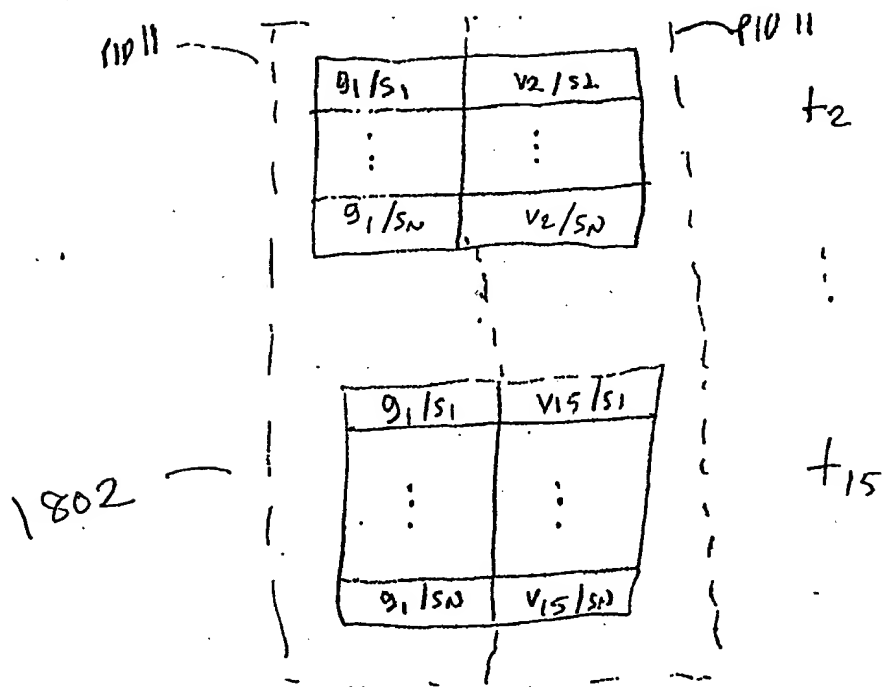
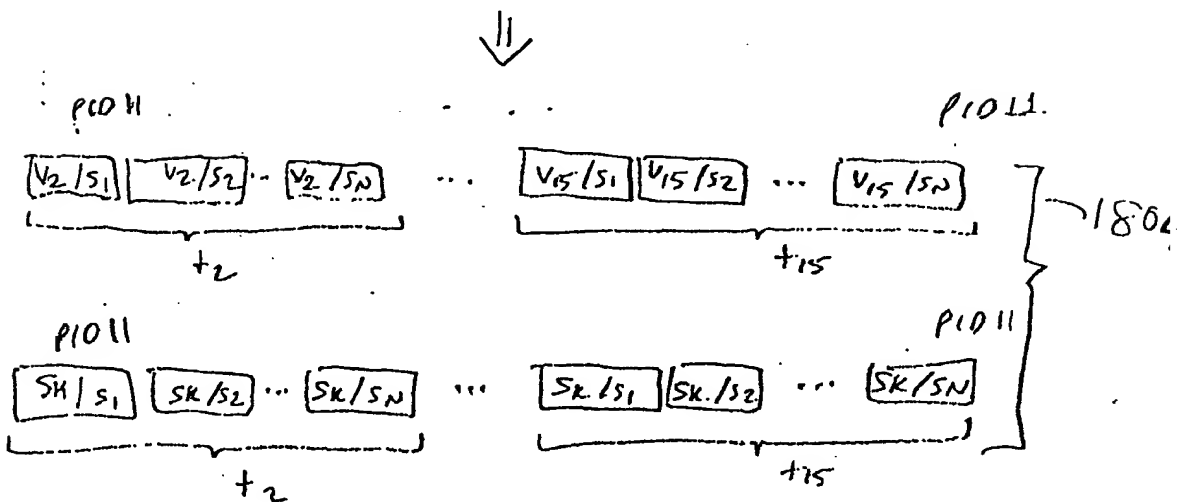


Figure 17



Scanning Video Slices
From left to right
top to bottom



Skipped
Guide
Slices

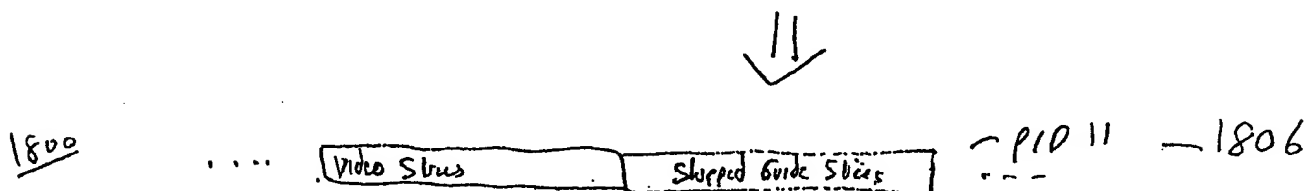
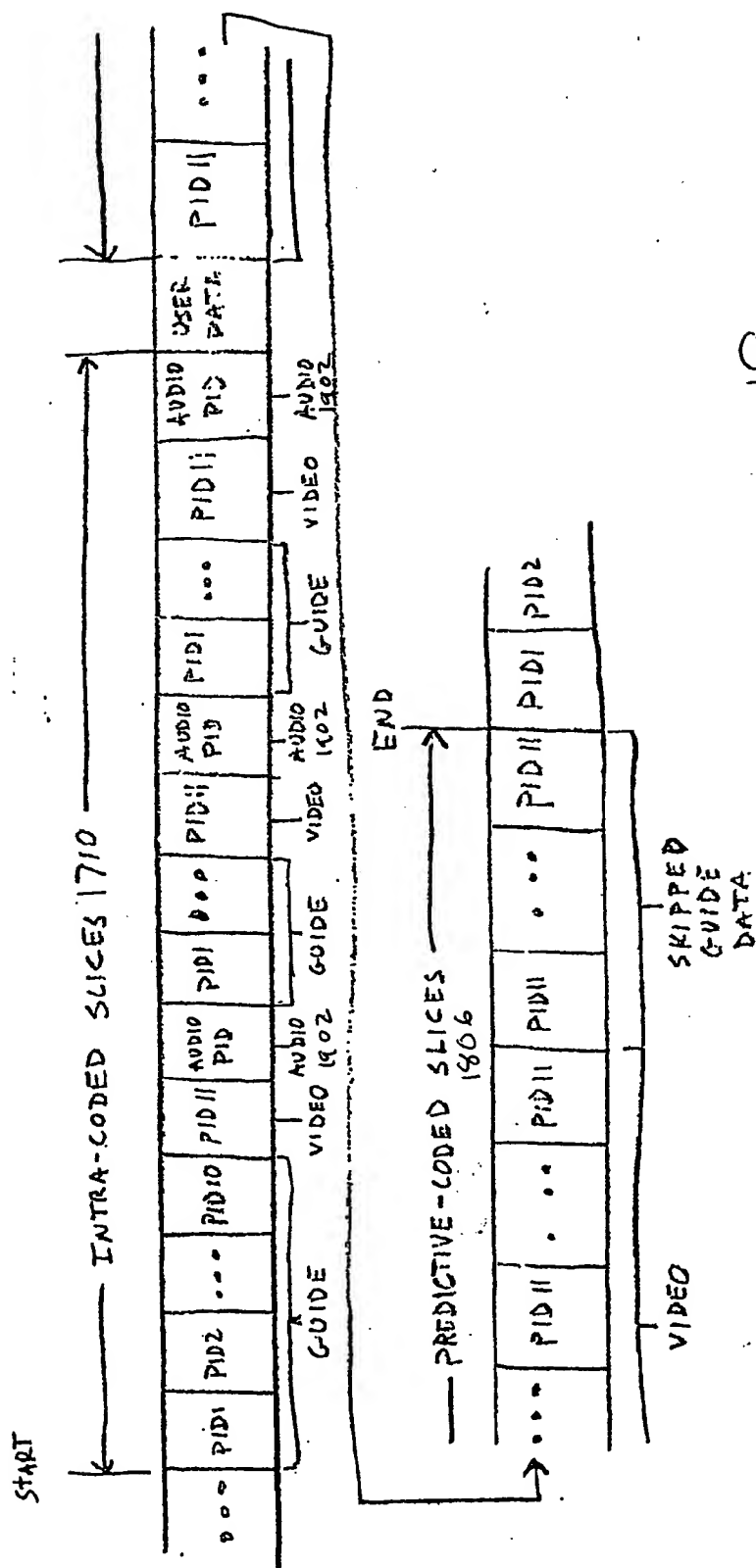


Figure 8



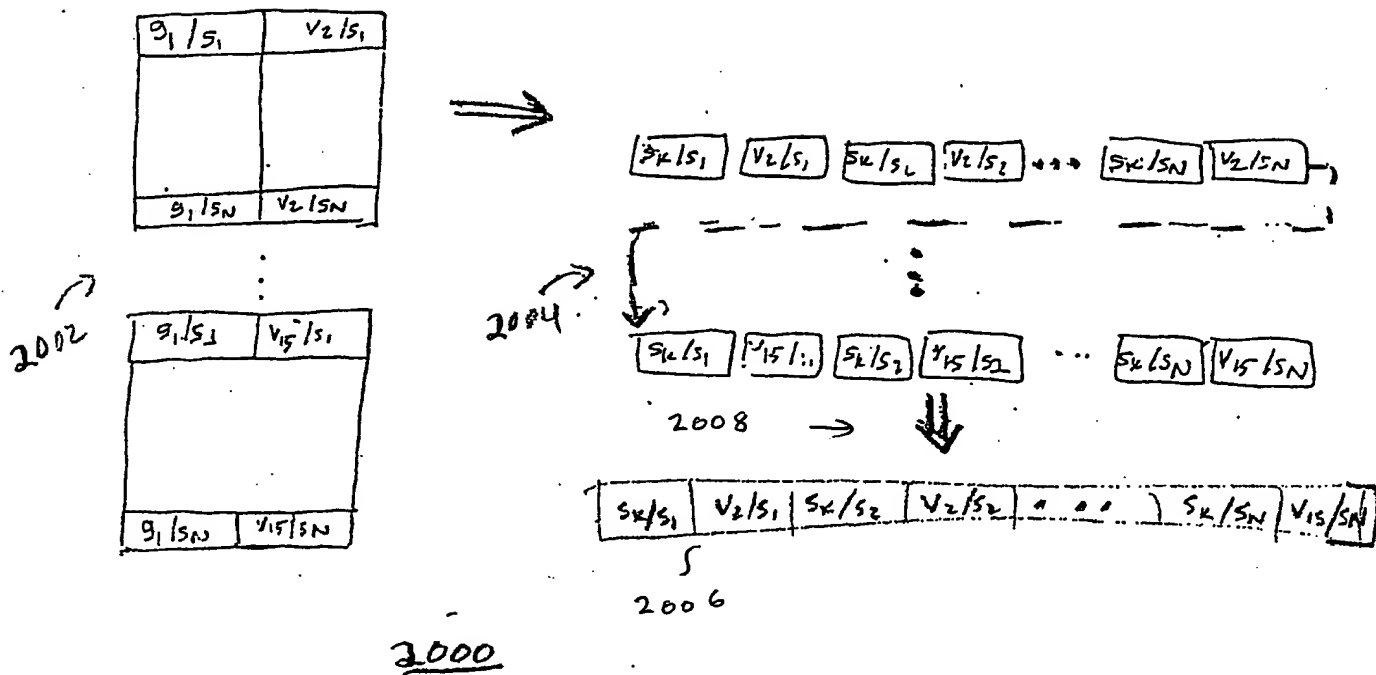


Figure 20

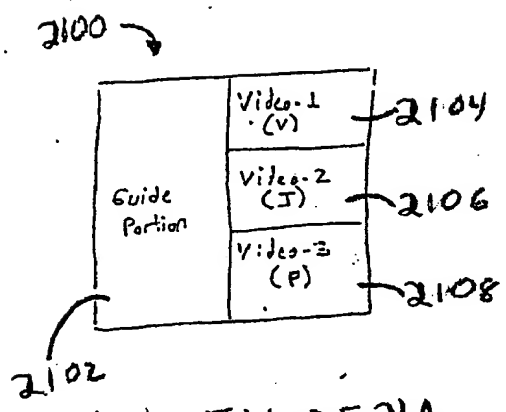


FIGURE 21A

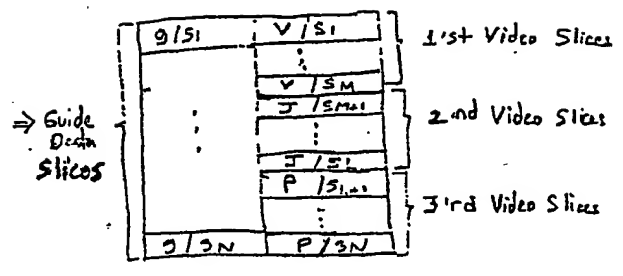


Figure 21B

60461 26699460

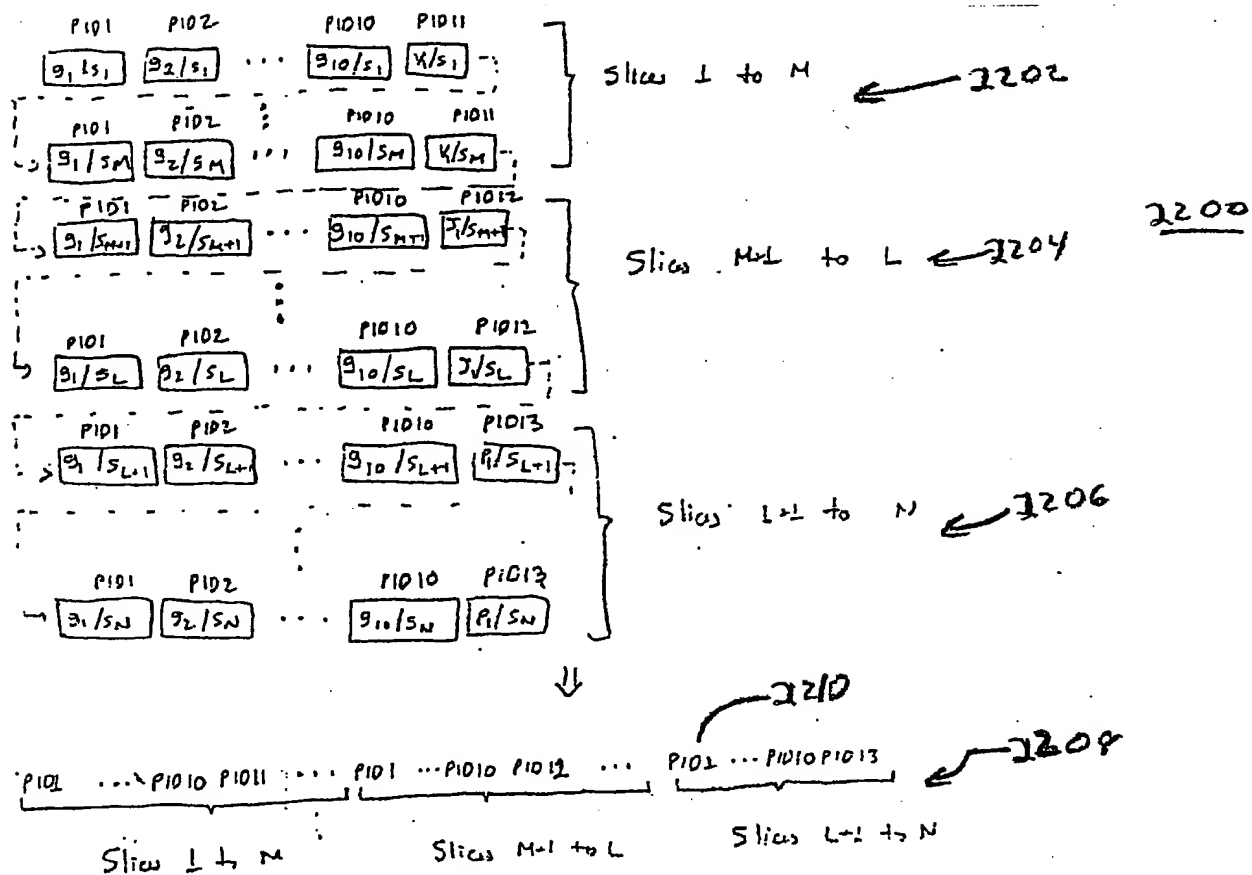


Figure 22

$$\begin{array}{ccccccc}
 \text{PID11} & & \text{PID11} & & \text{PID12} & & \text{SID12} & & \text{PID13} & & \text{PID13} \\
 \boxed{V_2/S_1} & \dots & \boxed{V_2/S_M} & & \boxed{I_2/S_{M+1}} & \dots & \boxed{I_2/S_L} & & \boxed{P_2/S_{L+1}} & \dots & \boxed{P_2/S_N} \\
 \underbrace{\hspace{10em}} & & \underbrace{\hspace{10em}} & & \underbrace{\hspace{10em}} & & \underbrace{\hspace{10em}} & & \underbrace{\hspace{10em}} & & \underbrace{\hspace{10em}} \\
 V \text{ slices} & & & & I \text{ slices} & & & & P \text{ slices} & &
 \end{array}$$

protected
video

2300

← 2302

$$z \rightarrow \boxed{V_{15}/s_1} \dots \boxed{V_{15}/s_M} \boxed{J_{15}/s_{M+1}} \dots \boxed{J_{15}/s_L} \boxed{P_{15}/s_{L+1}} \dots \boxed{P_{15}/s_N}$$

PID 10 PID 11 PID 12 PID 12 PID 13 PID 13
 [S_H/S₁] ... [S_K/S_M] [S_X/S_{M+1}] ... [S_X/S_L] [S_H/S_{L+1}] ... [S_K/S_N] → 1/2

Skipped Guide Slices Vertically Corresponding to Y Slices Skipped Guide Slices Vertically Corresponding to J Slices Skipped Guide Slices Vertically Corresponding to P Slices

Skipped
Guide
Slides

2304

$$\boxed{S_{X_1, S_1}} \dots \boxed{S_{X_{P-1}, S_{P-1}}} \boxed{S_{X_P, S_P}} \dots \boxed{S_{X_{P+1}, S_{P+1}}} \dots \boxed{S_{X_{P+Q-1}, S_{P+Q-1}}} \boxed{S_{X_{P+Q}, S_{P+Q}}} \rightarrow \frac{1}{P+Q}$$

Figure 23

Figure 24

```

graph TD
    START([START]) --> WAIT[WAIT FOR DESIRED I-STREAM PIDS]
    WAIT --> EXTRACT1[EXTRACT PACKETS OF DESIRED I-STREAM PIDS]
    EXTRACT1 --> COUPLE1[COUPLE PAYLOAD'S OF DESIRED I-STREAM PACKETS TO VIDEO DECODER]
    COUPLE1 --> EXTRACT2[EXTRACT PACKETS OF PREDICTED PICTURE STREAM PIDS]
    EXTRACT2 --> COUPLE2[COUPLE PAYLOAD'S OF PREDICTED PICTURE STREAMS' PACKETS TO VIDEO DECODER]
    COUPLE2 --> SELECT{SELECT DIFFERENT I-STREAM PIDS}
    SELECT -- NO --> WAIT
    SELECT -- YES --> IDENTIFY[IDENTIFY PIDS OF NEW DESIRED I-SLICES]
    IDENTIFY --> WAIT
  
```

Figure 25

607 260940

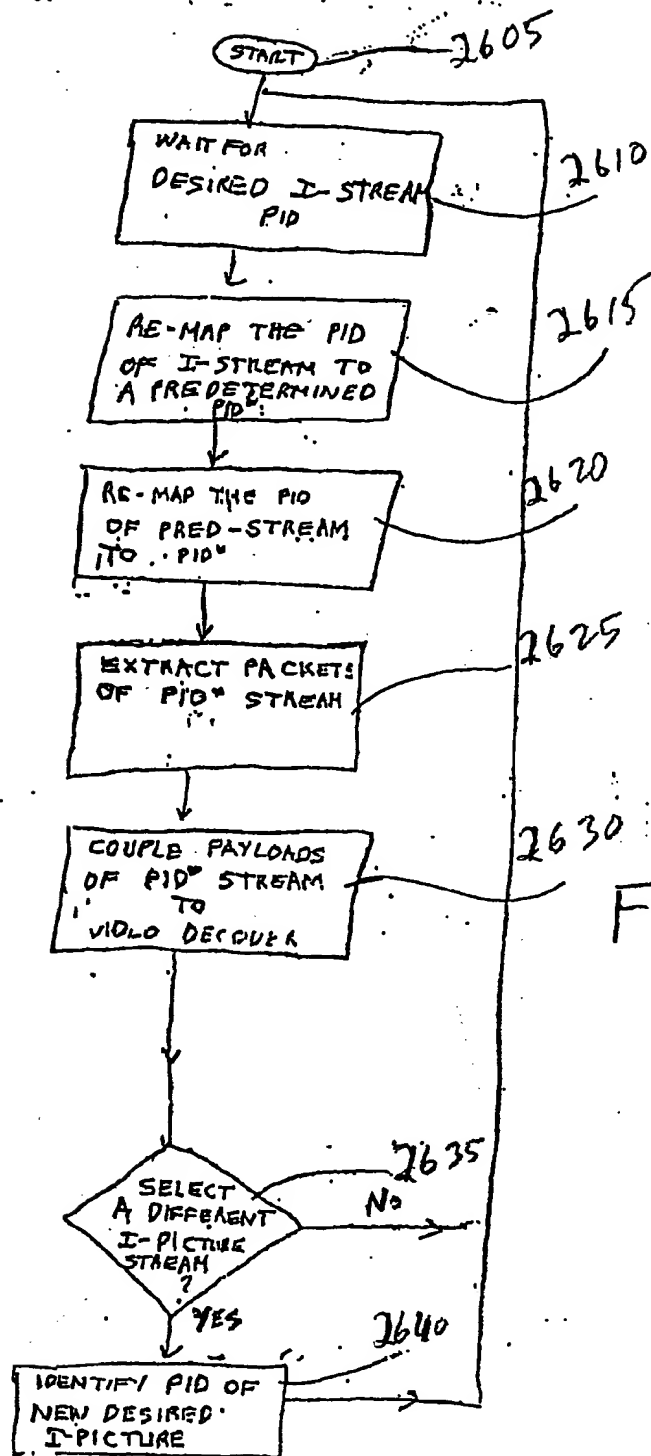


Figure 26

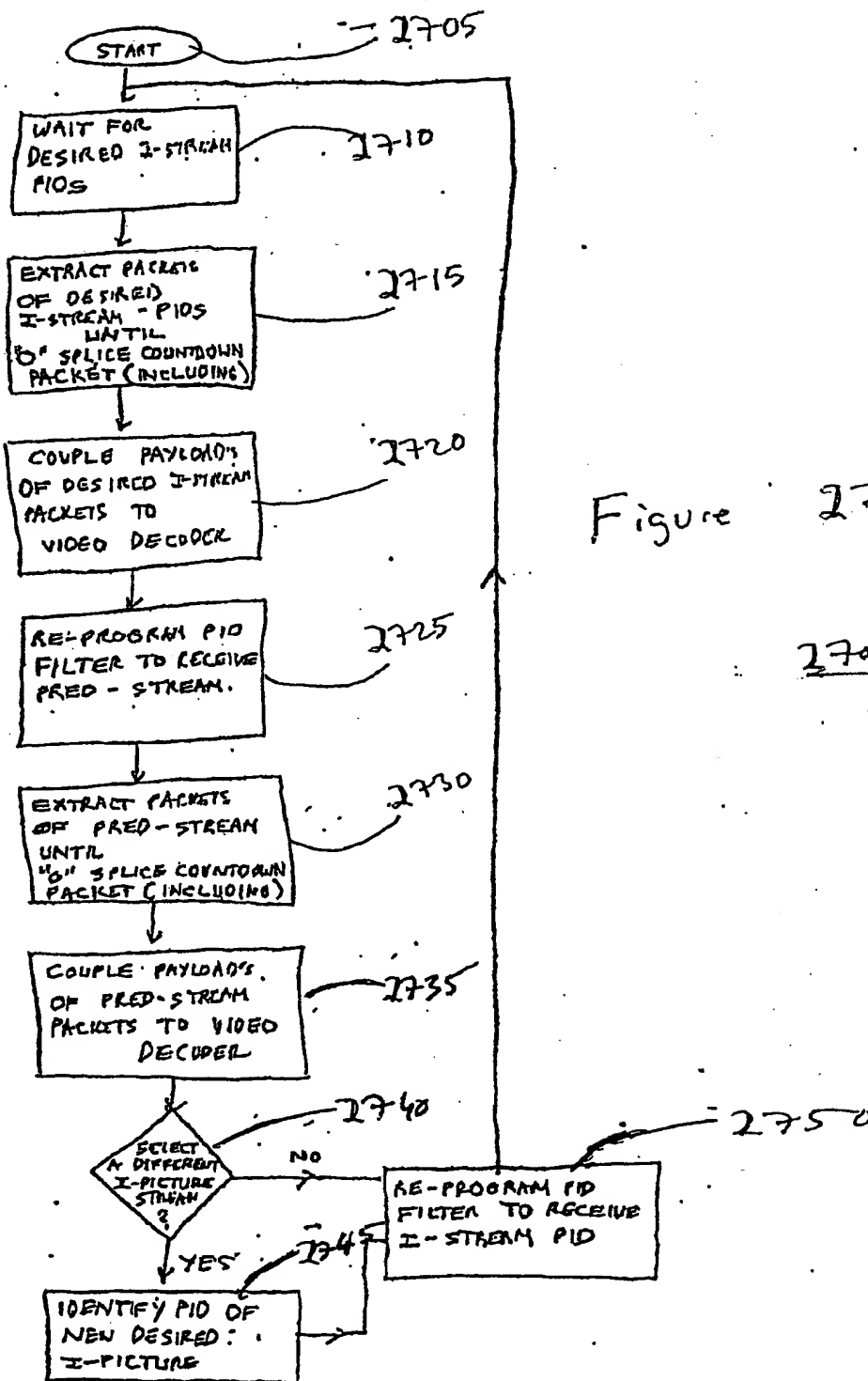


Figure 27

2700

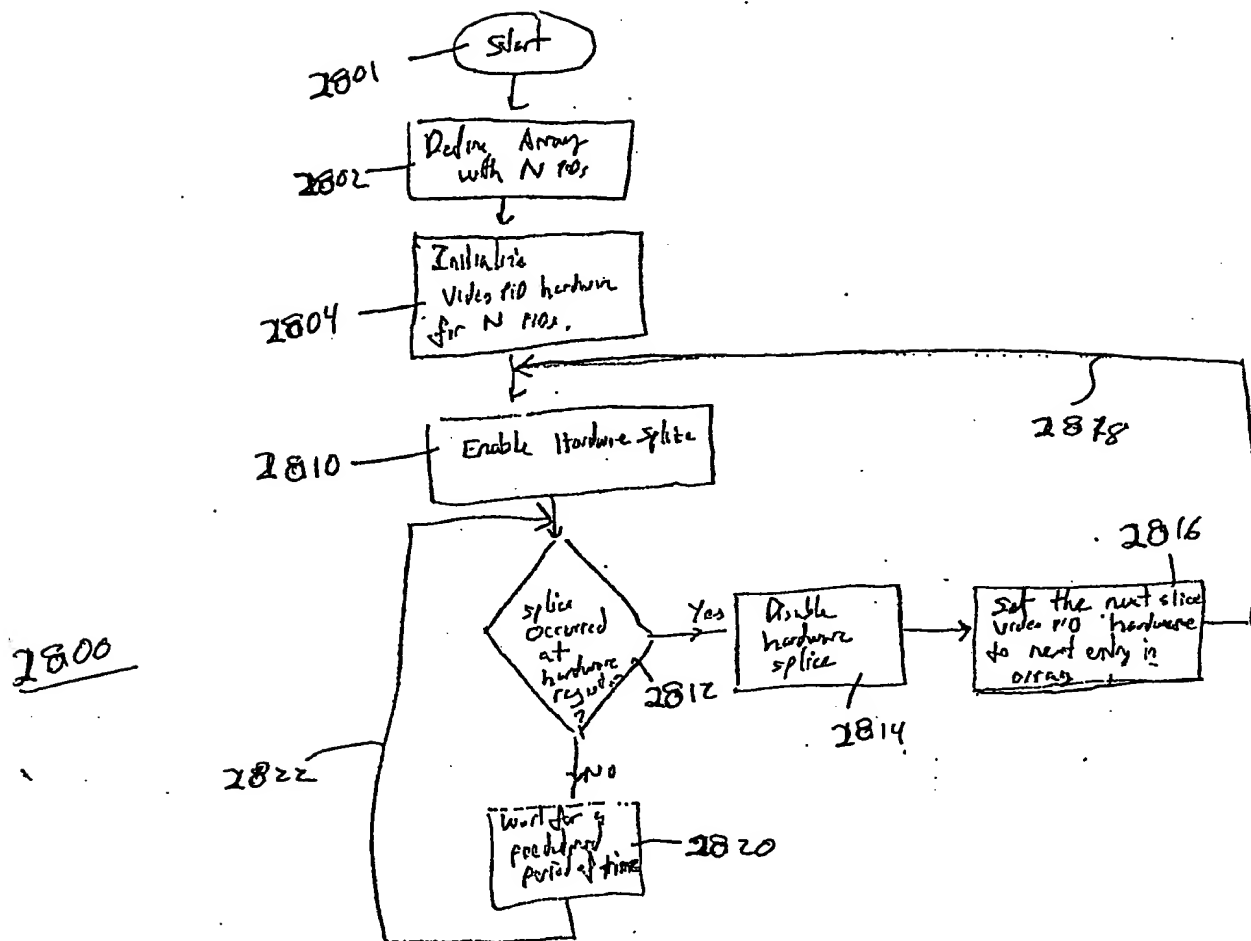
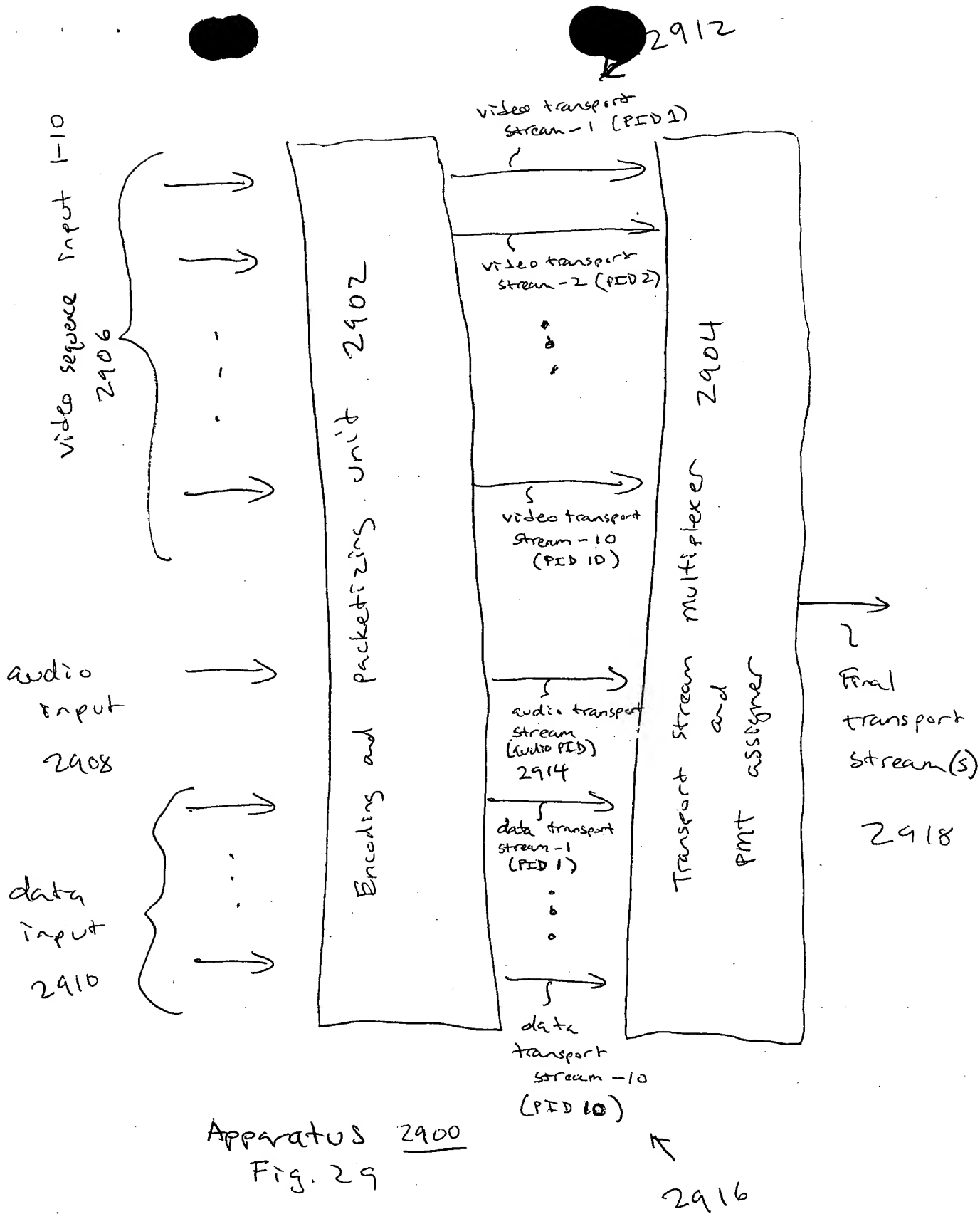
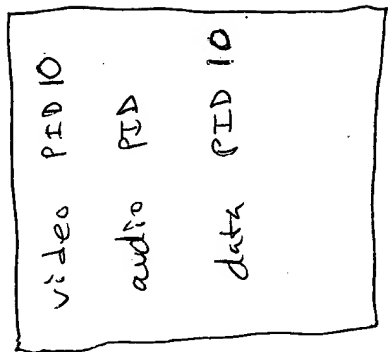
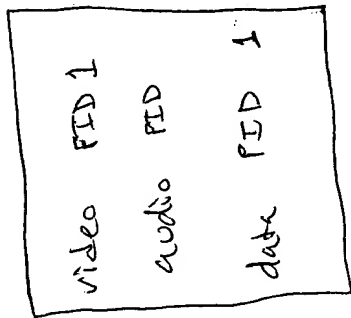
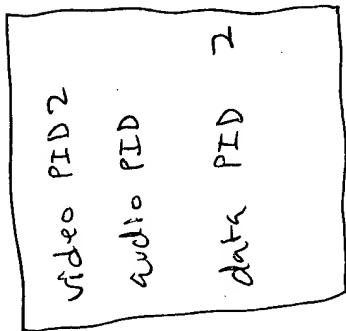


Figure 18





...



Program 10
3010

...

Program 2
3002

Program 1
3001

Single Transport, Multiple Program
Program Assignment 3000
Fig. 30

Program 3102

video PID 1

video PID 2

⋮

video PID 10

audio PID

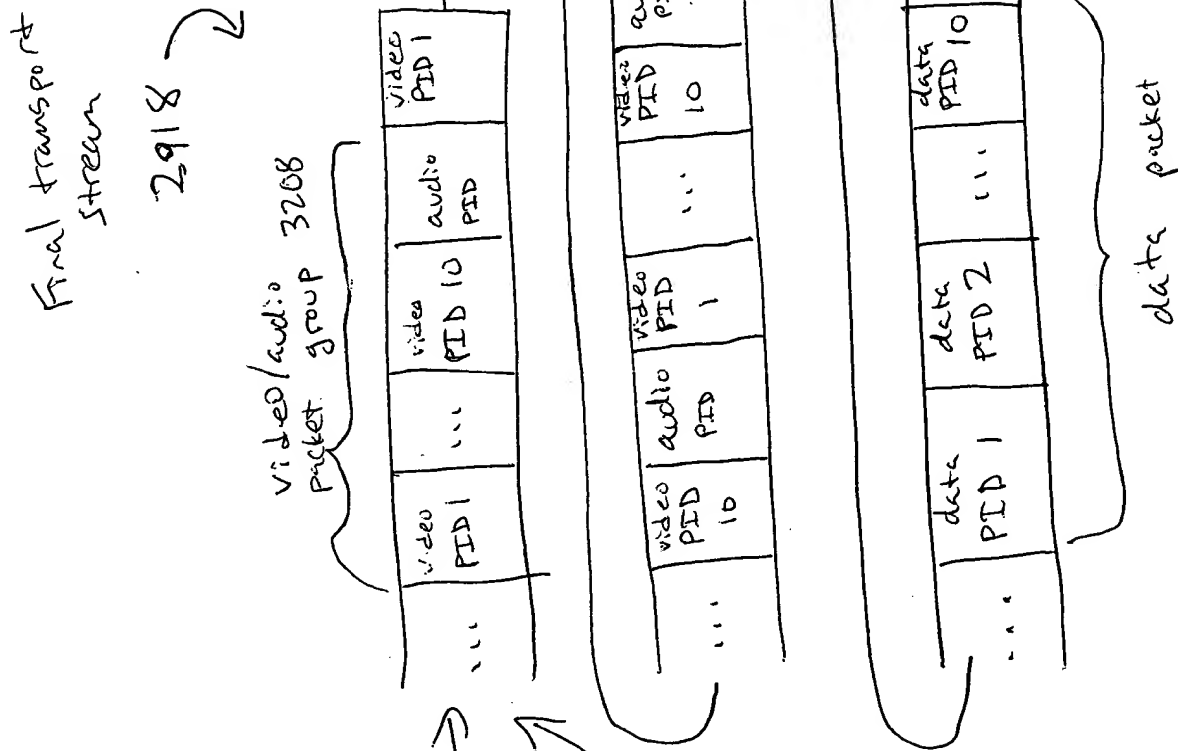
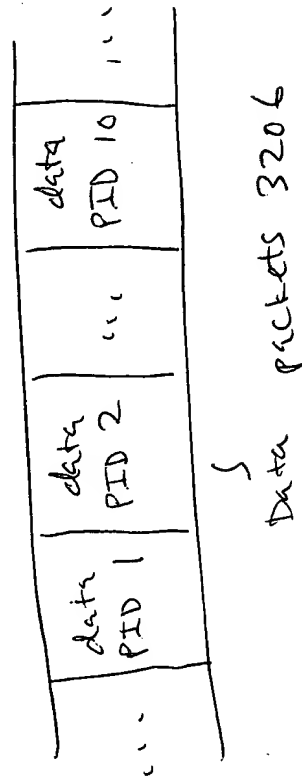
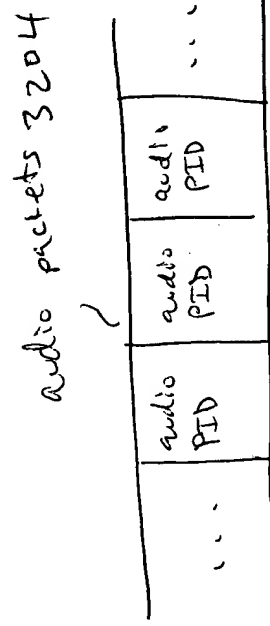
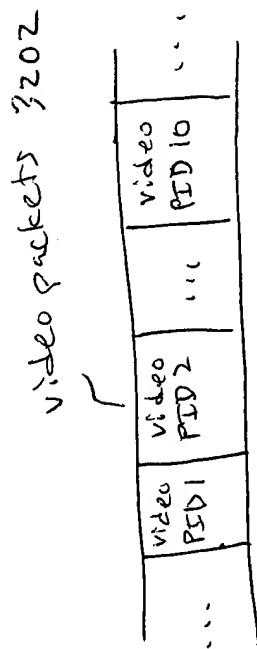
data PID 1

data PID 2

⋮

data PID 10

Single Transport, Single Program
Program Assignment 3100
Fig. 31

[illegible]

multiplexing into single Transport

Fig. 32

Transport Stream 1
3302

video PID 1	
video PID 2	
video PID 3	
audio PID	
data PID 1	
data PID 2	
data PID 3	

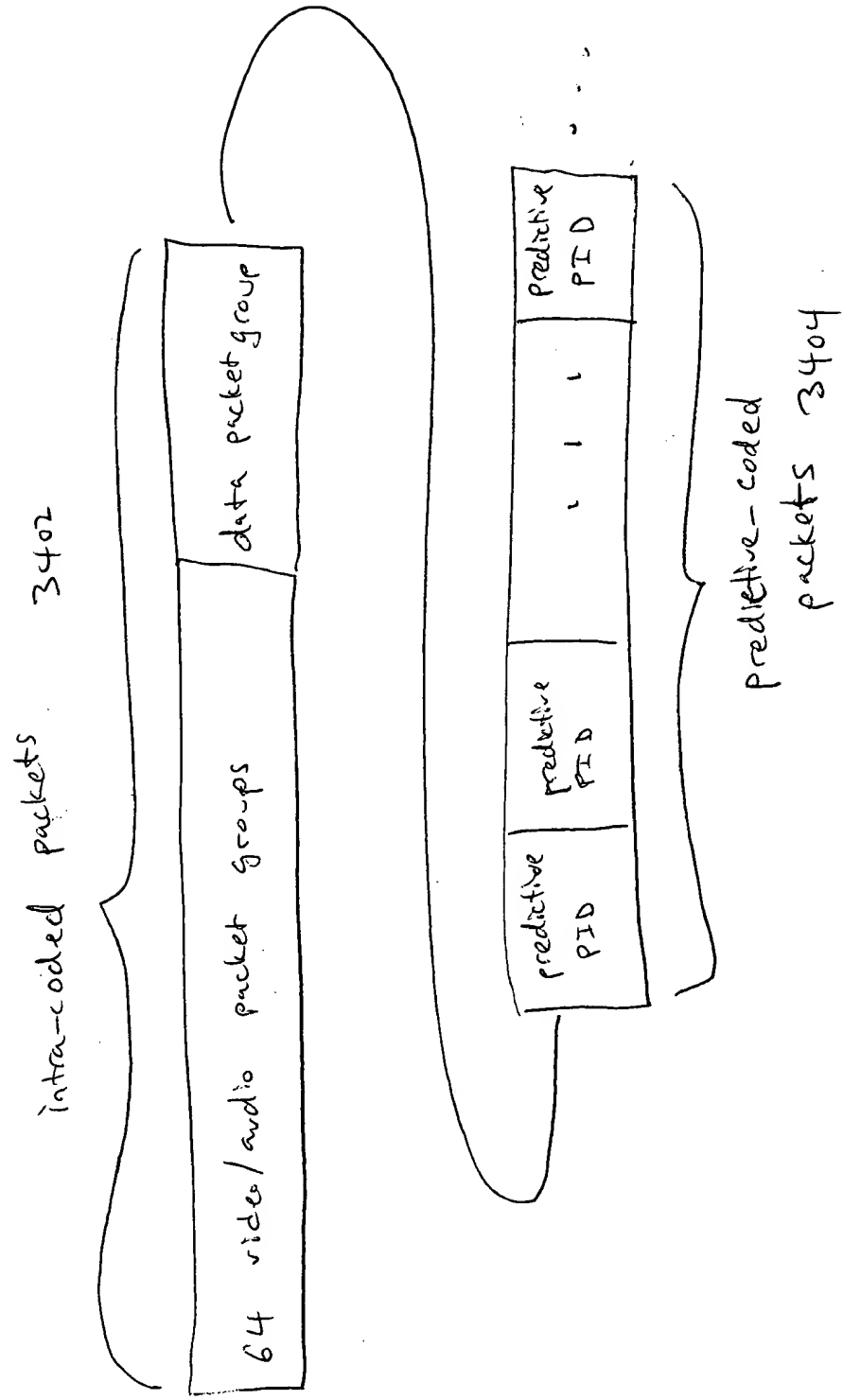
Transport Stream 2
3304

video PID 4	
video PID 5	
video PID 6	
audio PID	
data PID 4	
data PID 5	
data PID 6	

Transport Stream 3
3306

video PID 7	
video PID 8	
video PID 9	
video PID 10	
audio PID	
data PID 7	
data PID 8	
data PID 9	
data PID 10	

Multiple Transport
Assignment Structure 3300
Fig. 33



Final Transport Stream 3400

Fig. 34

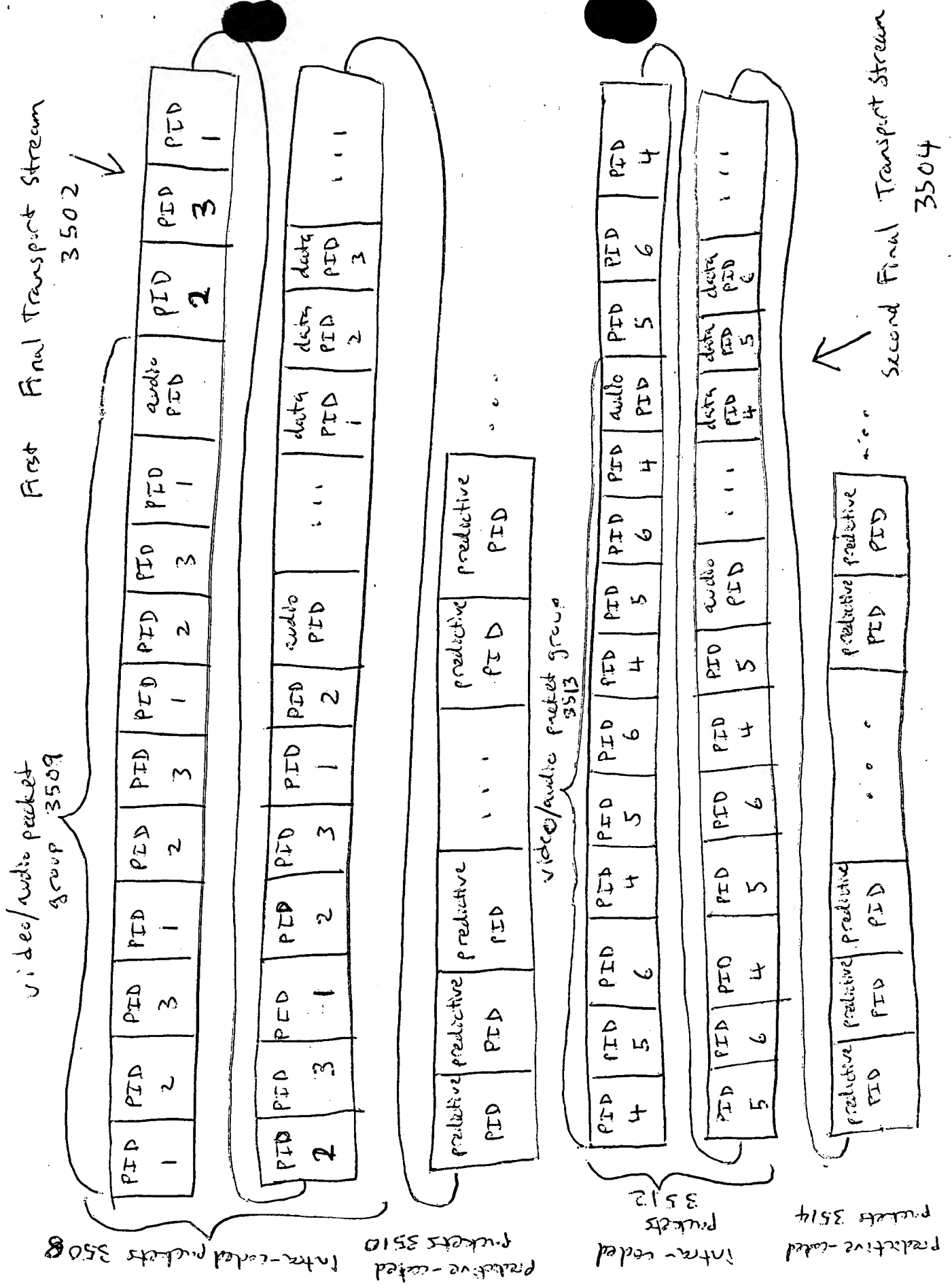
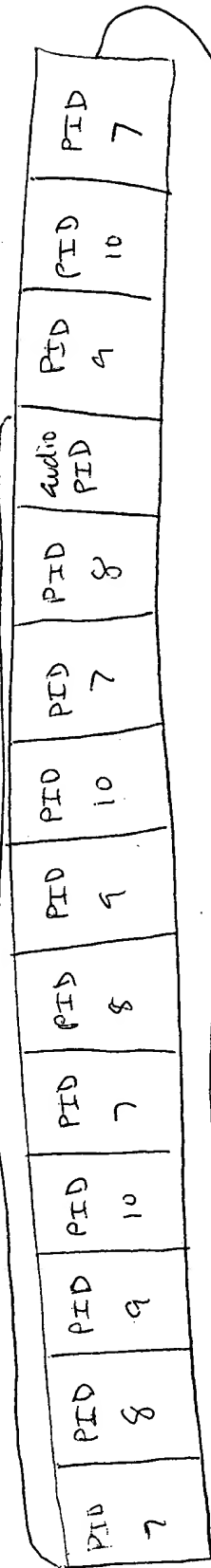


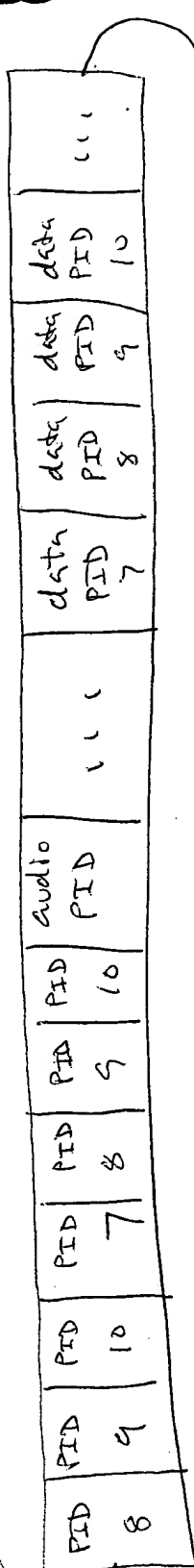
Fig. 35A

FIG. 35A

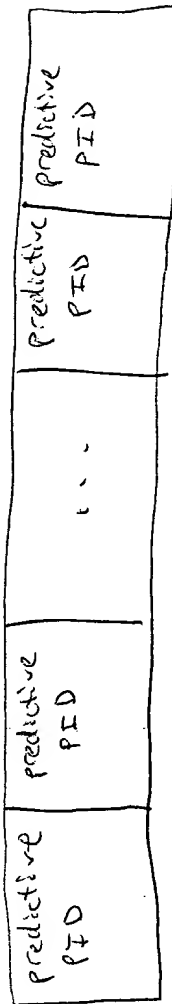
video/audio packet group 3517



intra-coded packets 3516



predictive-coded packets 3518

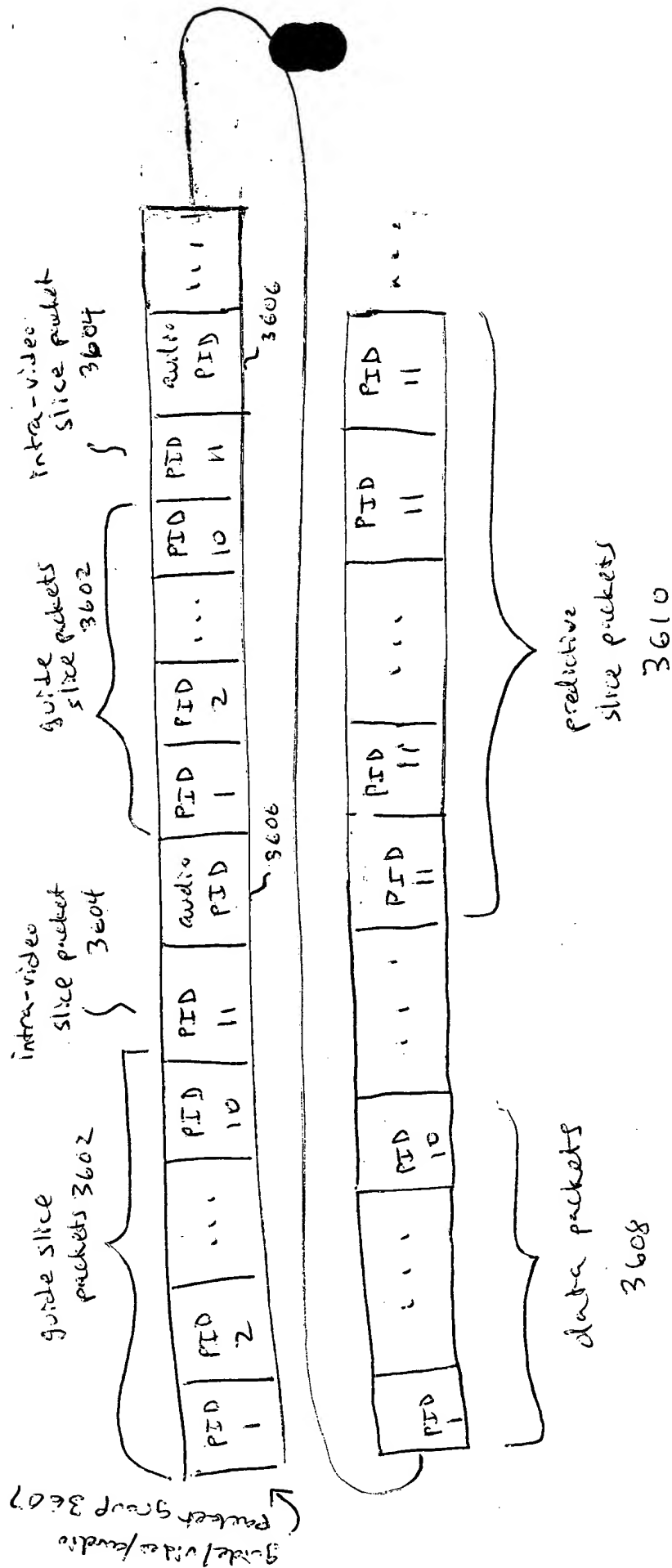


third final

transport stream

3506

Fig. 35B



Final Transport Stream 3600

Fig. 36

First Transport Stream

3702

PID 1	PID 2	PID 3	PID 1	PID 2	PID 3	...
-------	-------	-------	-------	-------	-------	-----

PID 3	PID 4	PID 5	PID 3	PID 4	PID 5	...
-------	-------	-------	-------	-------	-------	-----

2

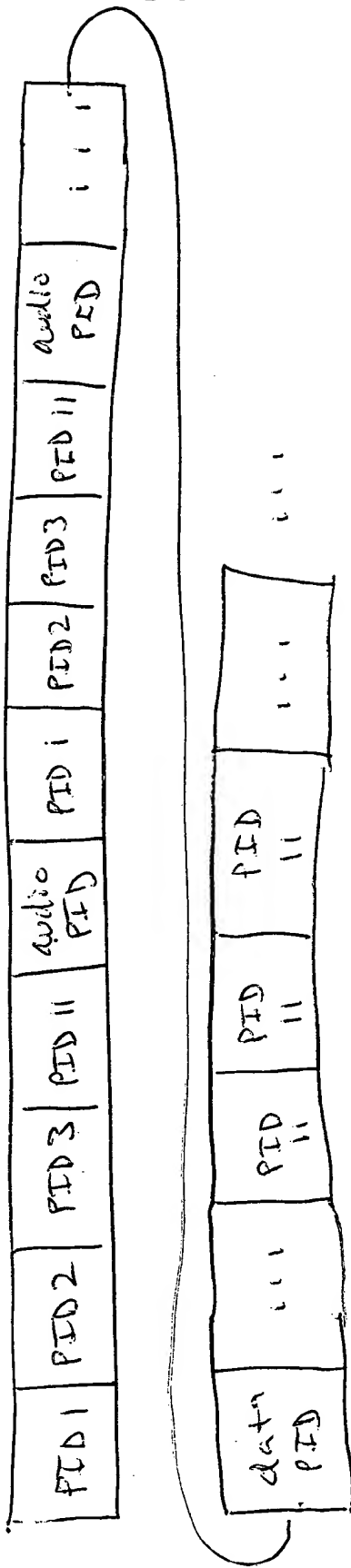
Second Transport Stream

3704

Fig. 37

First Transport Stream

3802



Second Transport Stream 3804

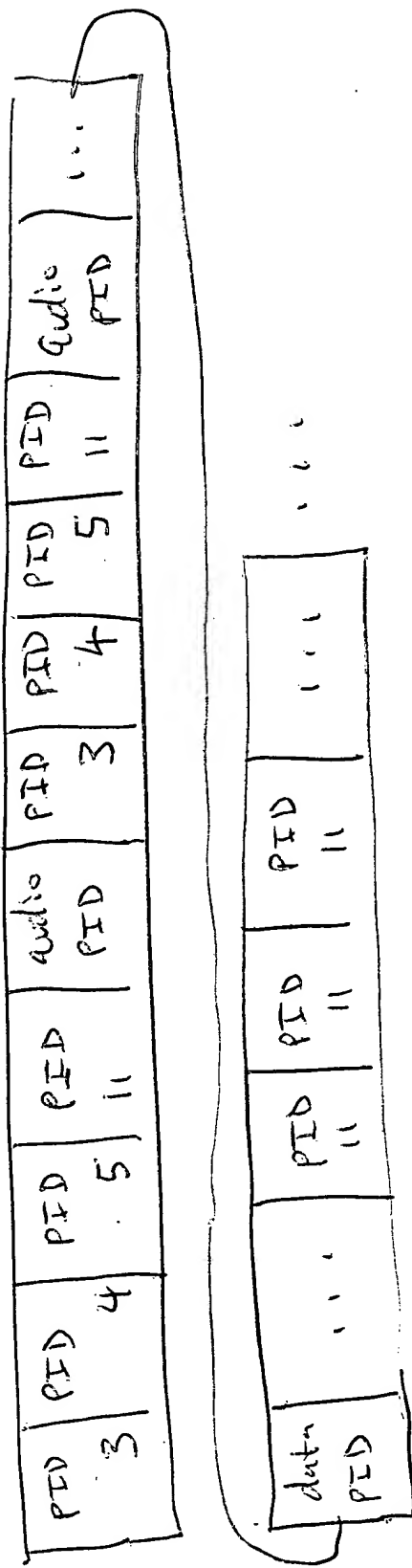


Fig. 38

Illustrative
IPG Page

Program guide

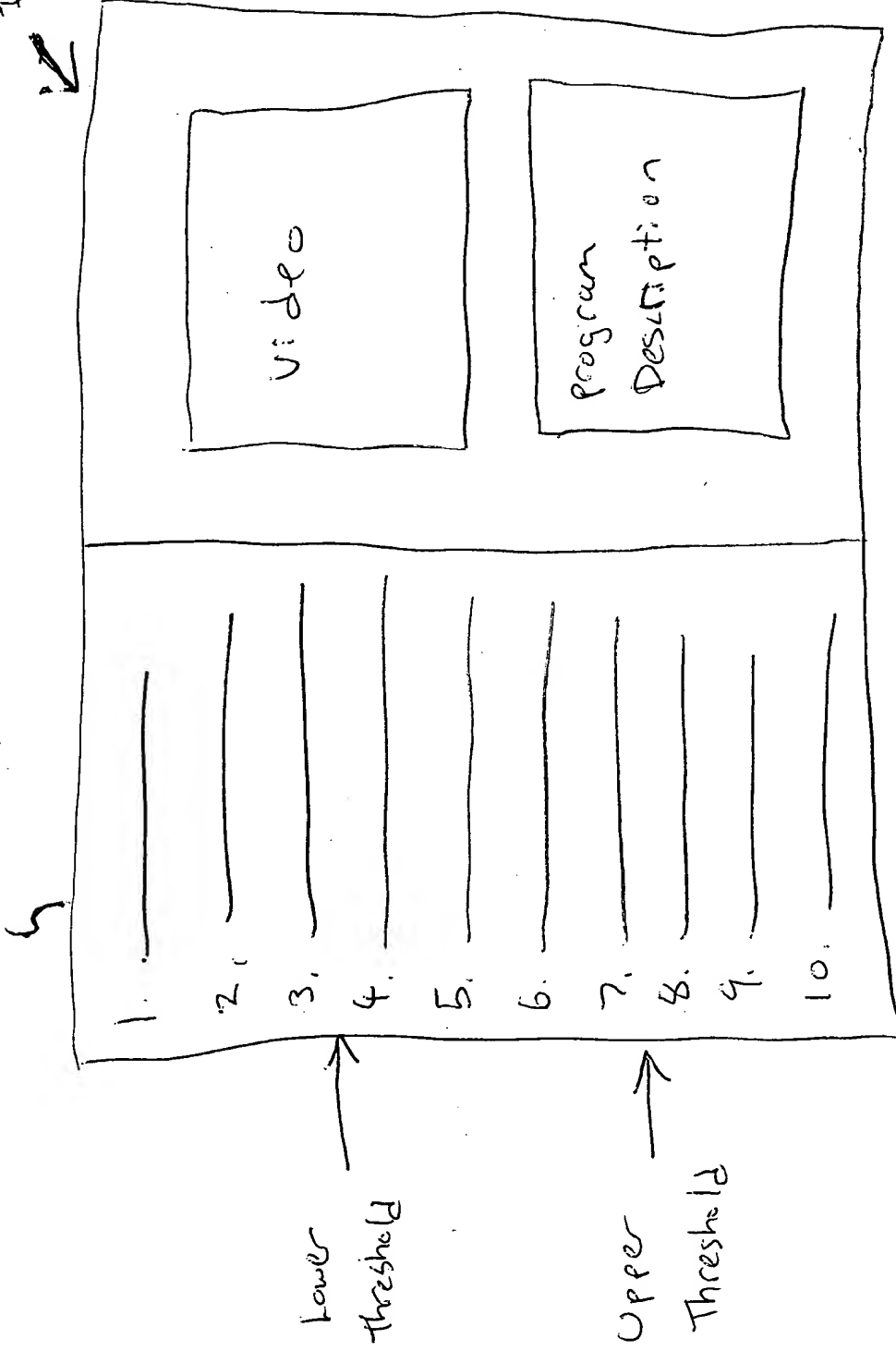


Fig. 39

00000000 00000000 00000000 00000000

total
8190
PIDs

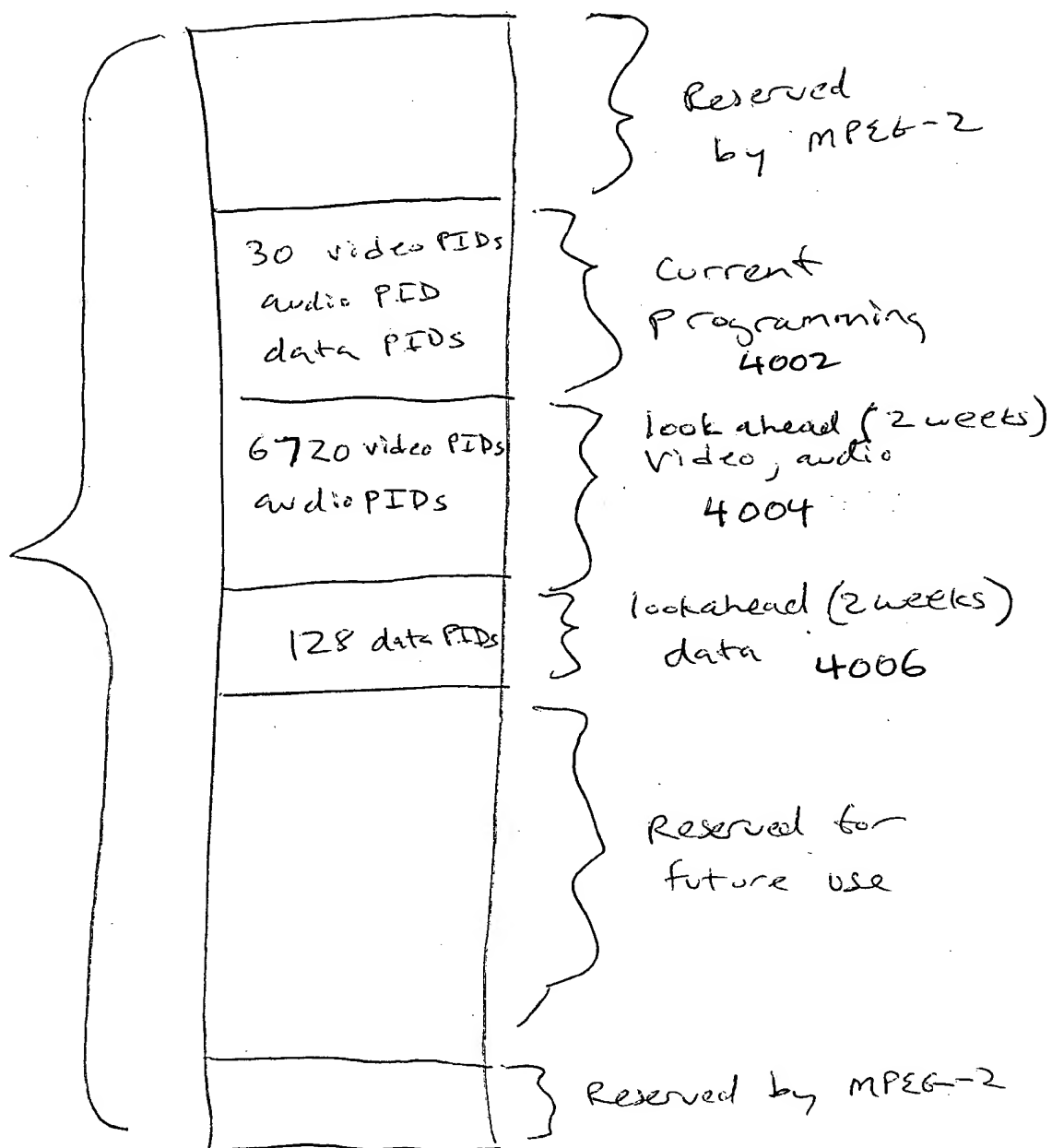
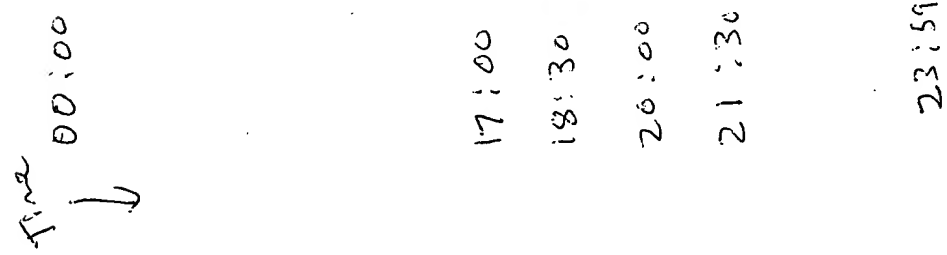
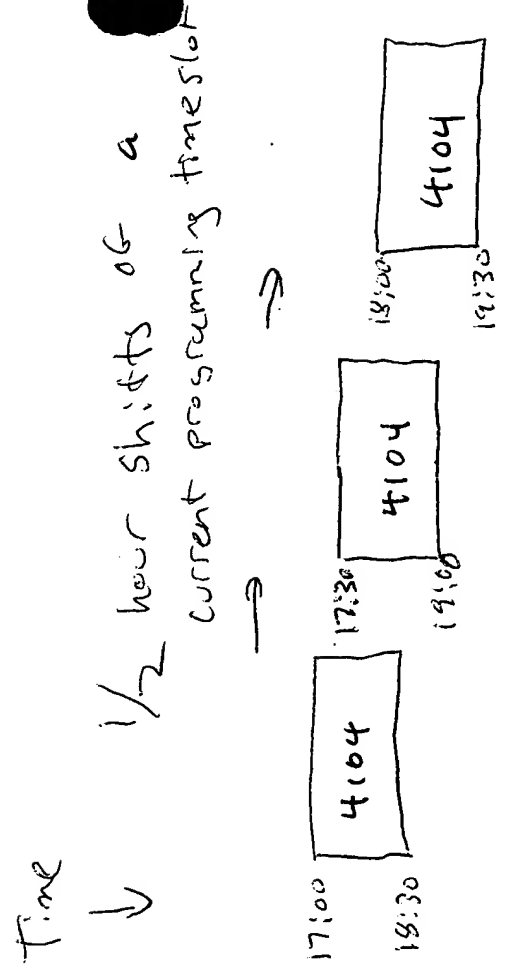


Fig. 40



(a)



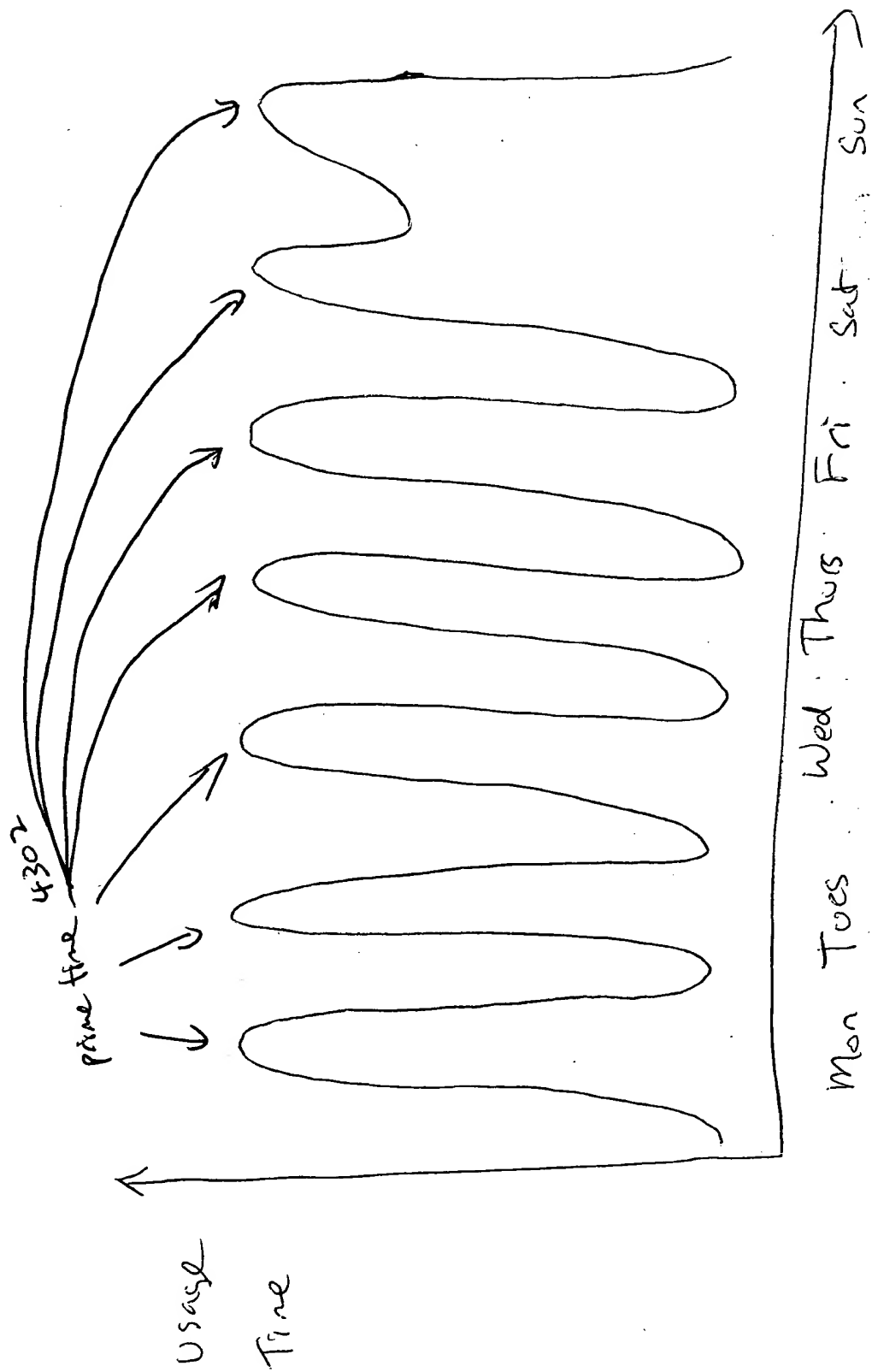
Prime Time 4102

(b)

Fig. 41

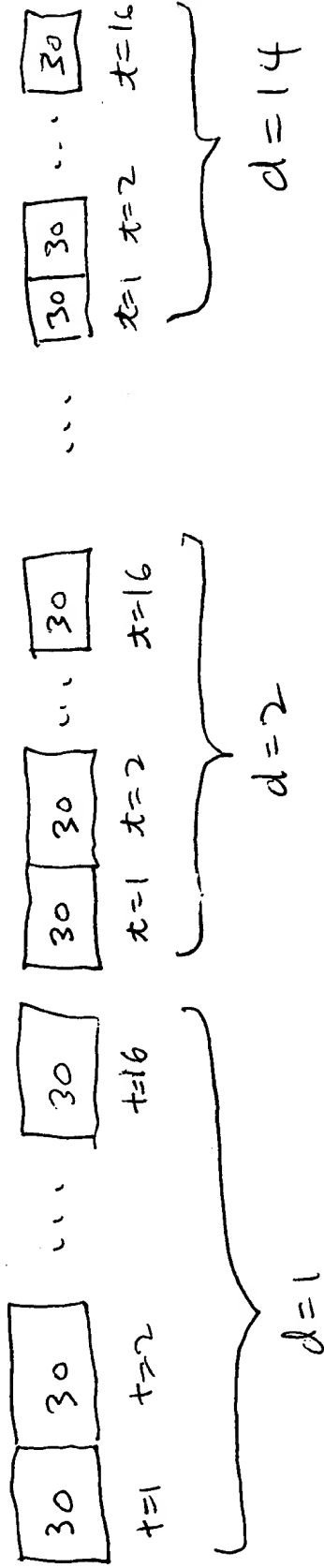
$$\begin{array}{c} d_1 \\ d_2 \\ d_3 \\ \vdots \\ d_{60} \\ \vdots \\ d_{126} \\ d_{127} \\ d_{128} \end{array}$$
$$\begin{array}{c} V_1 \\ V_2 \\ V_3 \\ \vdots \\ V_{10} \\ \vdots \\ V_{50} \\ \vdots \\ V_{120} \\ \vdots \\ V_{6718} \\ V_{6719} \\ V_{6720} \end{array}$$

Fig. 42



Time of
week

Fig. 43



4400

Fig. 44A

4422

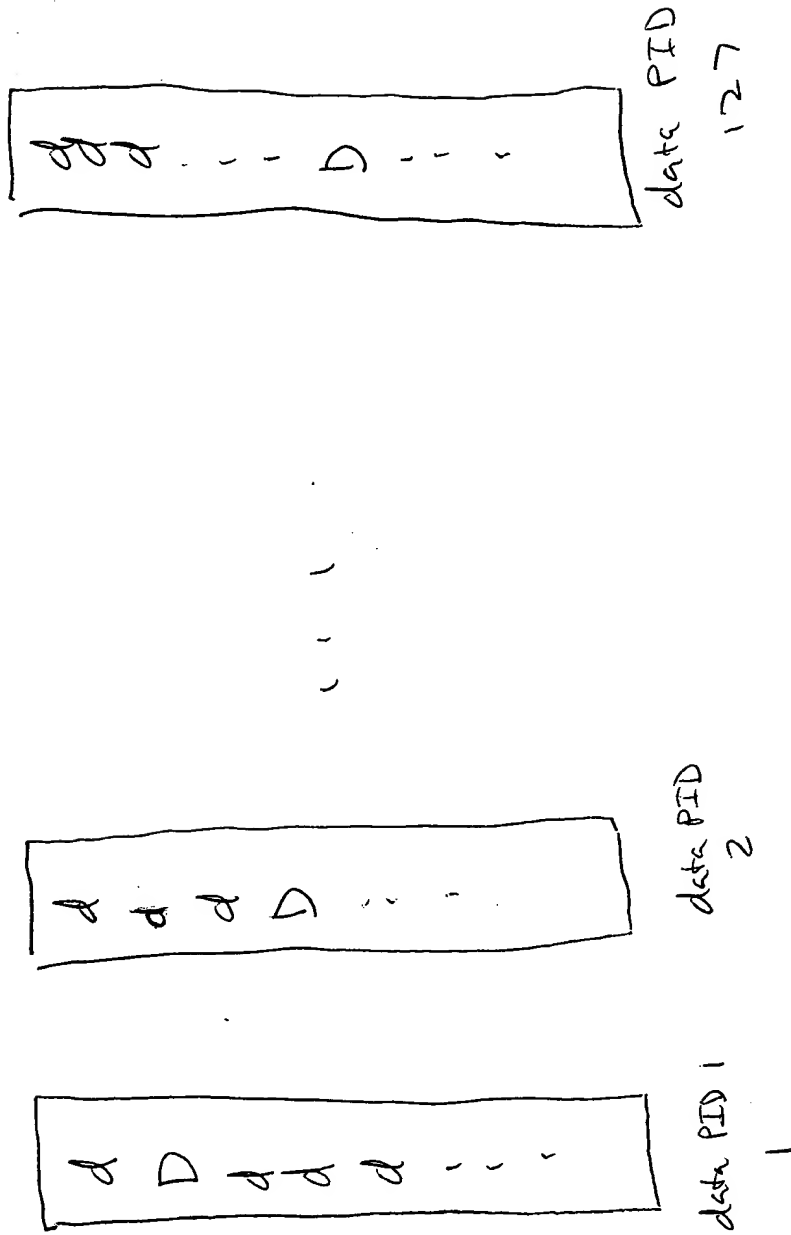
largest prime # \leq total # of data PIDs available
 \Downarrow
 prime # = 127 $<$ 128

4424

data PID# = Video PID# (mod prime #)
 = video PID# (mod 127)

Fig. 446

4420



d = non-prime time data message
D = prime time data message

Fig. 44C